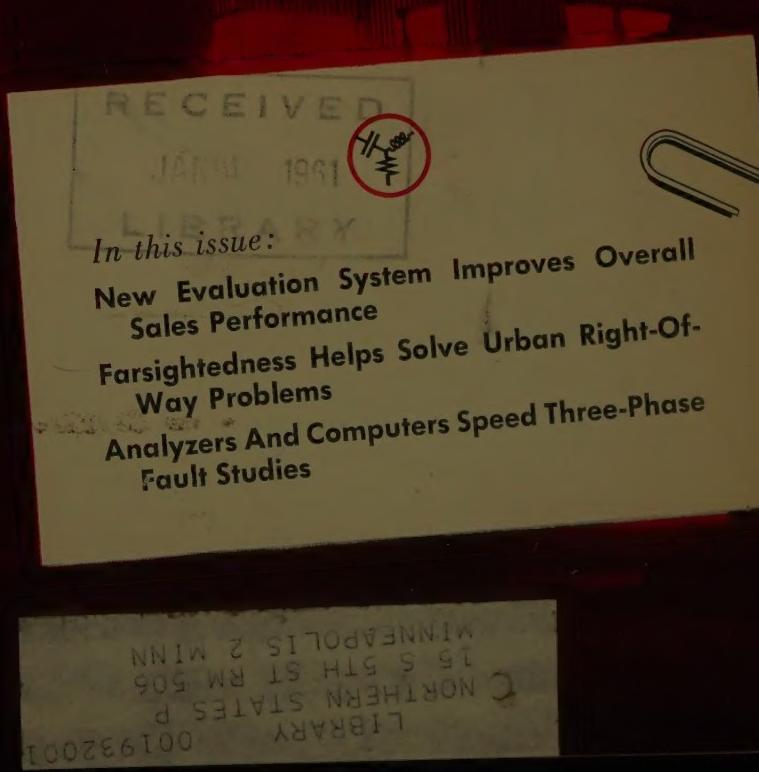


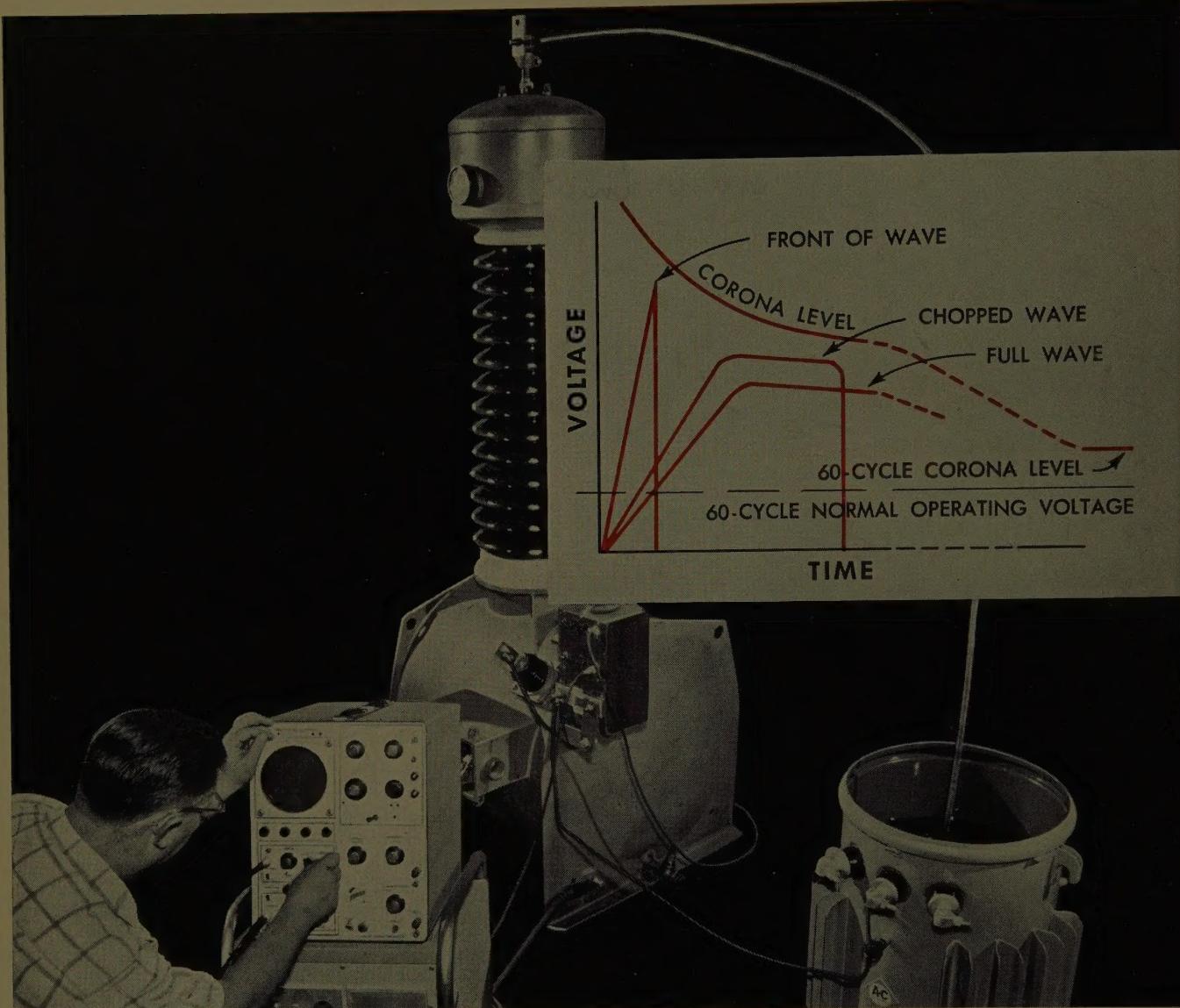
ELECTRIC LIGHT & POWER

ELECTRIC LIGHT AND POWER

JANUARY 1, 1961



ALLIS-CHALMERS



Proven corona-free design lengthens transformer life

Allis-Chalmers transformer insulation (both winding and barrier) is designed (and proven by tests) to be *entirely free of corona*...not only at the operating voltage, but at *all test levels*. By use of superior measuring techniques and instrumentation, Allis-Chalmers engineers have established design criteria which bring this benefit to all A-C transformers from 5 kva through power transformers in the ASA standard range. Corona — the cancer of electrical equipment — is eliminated. The problems of carbonization of insulations and thermal breakdown of oil are substantially reduced.

Extensive studies on "compatibility" of insulations have also helped to increase transformer life. Through accelerated tests on many laboratory models and long-

time tests on completed transformers Allis-Chalmers engineers have determined the ideal material combinations. Controlled processing to eliminate air and moisture lowers moisture content to as low as twenty parts per million.

Because of these three major factors . . . all A-C transformers in the above ratings built since January 1, 1960, are capable of delivering a twelve-percent increase in capacity at 65°C rise without loss of life.

For more information about the additional built-in capacity of Allis-Chalmers transformers call your nearest A-C representative. Or write, Power Equipment Division, Allis-Chalmers, Milwaukee 1, Wisconsin.



LIGHT AND POWER LINES

The Year Ahead Will Challenge Executive Leadership In Our Industry As Never Before—If our industry is to attain those 1970 and 1980 goals that EEI has forecasted for it, this new year is going to have to show a vast improvement over 1960. Certainly the promise of the '60s and the '70s is still there but the new decade the industry entered last year got off to a mighty slow start. It will take great and united efforts to step up the pace markedly as this new year gets under way.

As this is written, serious uncertainties beset our industry. They range from the chaotic political outlook generally to the chaotic price situation on power-system equipment. It seems a safe bet that the political uncertainties will be resolved long before any reasonable price stabilization comes about. And yet the latter problem is of utmost importance to the future well-being of our entire industry.

One thing is certain; the "price only" complex that has been all too prevalent this past year must not be allowed to continue to govern the award of orders for new equipment. Utility executives responsible for design, operation and maintenance of power-system facilities must retain the major voice in selection of new equipment, for it is they who can best judge of its long-term worth.

EL&P's New Graphic Style And Format To Improve Readability And Impact Of Presentation—In the interest of upgrading and modernizing our publication, we are starting off the new year with a re-design from cover to cover.

Our familiar EL&P logo on the front cover has been re-designed with a cleaner, modern type. Rearrangement, crisper type and improved use of color give new impact and readability to our table-of-contents spread on pages 4 and 5.

A consistent, uniform type face has been chosen for the headings of the three major sections of EL&P, with a carryover design to all departments within a section. Further prominence is given to all departments through two-column treatment of all lead pages.

By-lined staff contributions such as "Light & Power Lines," "Washington Outlook," and "Economic Outlook" feature new treatment designed to enhance readership.

Examination of the main editorial pages will disclose a cleaner, more open look; careful cropping of photos to bring out and emphasize only the important elements. Judicious use of color and layout contributes to better appearance and functional purpose, as do the re-designed headlines and subheads.

This "new look" throughout EL&P is just another evidence of our continuing effort to adopt improved presentation techniques that we feel will add to EL&P's value to its readers.

Watch For EL&P's Feb. 1 Annual Forecast Issue—Coming up on Feb. 1 is our EL&P report on the 1961 construction program of electric utilities throughout the country.

In addition to the major budget allocation figures for the utility industry as a whole, this report will include comprehensive categorical breakdown on projected 1961 expenditures for new electrical and mechanical equipment.

Also included in our Feb. 1 feature issue will be EEI's year-end report, with supplemental charts prepared by EL&P to dramatize the important developments reported therein.

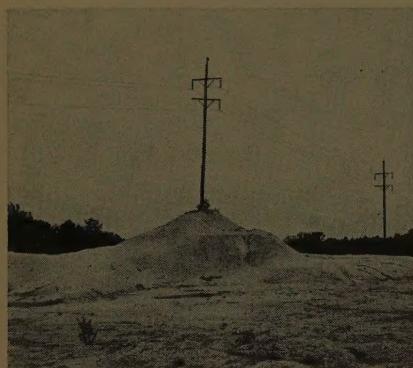
We shall also take a long look ahead at the exciting prospects for expanded power use in industry, in commercial establishments, in the home, on the farm, and in street and highway lighting. This section also will be liberally illustrated with special EL&P charts.

Supplementary information will also be given on the expansion plans of a large segment of our electric-utility industry, with specific utility identification.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



This shows one of the problems that occur when a power company gets an easement instead of a fee title. It will necessitate grading and reconstruction of this 69-kv transmission line—at the company's expense.



The "President's Trophy" which Southern California Edison Company awards at the end of each year to its most effective district sales team. The utility's President J. K. Horton inspects the award with Vice-President T. M. McDaniel, Jr.

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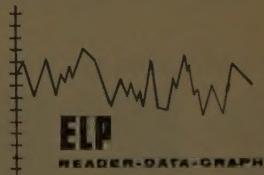
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OUR COVER

Every year the employees of the Oklahoma Gas and Electric Company's Arbuckle Generating Station place a large Christmas tree on the outdoor turbine room of their station. It is located near a highway and attracts the attention of thousands of travelers each Christmas season.



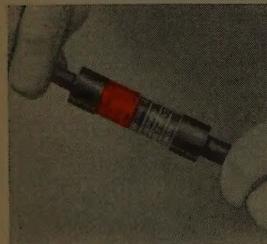
here it is! A REAL ONE-HAND TOOL

installs
INSULINK® and LINKIT®
one crimp per end!

You'll like this ONE-HAND TOOL . . . from start to finish, you can really work it with only ONE HAND. You can close it with less than a 50 lbs. squeeze; it weighs only 2½ lbs. and is only 12" long. You couldn't ask for an easier service tool . . . it's the only *real* ONE-HAND TOOL.

Position the OH25 HYTOOL once . . . and only once . . . on each side of the INSULINK or uninsulated LINKIT. It has a new die that crimps the entire contact area at one time. You don't have to reposition, you can't overlap crimps, and you never make less than the proper number of crimps.

And, it takes only ONE CRIMP PER END . . . a series of easy, ratchet controlled strokes to make a perfect crimp every time. The new dies cause the conductor strands to rub together, removing the oxide film for more stable, low resistance connections.



Insert stripped wire ends into INSULINK; caps grip and hold conductors.



Get up close to your work. Position ONE-HAND TOOL on INSULINK only once per crimp.



A series of easy strokes complete the crimp. Dies produce oxide removing wiping action between conductor strands.



ANOTHER MAJOR DEVELOPMENT IN THE

BURNDY

60-16
COMPRESSION PROGRAM



LIGHT AND POWER LINES

Amateur Radio Club Kept Constant Tab On Hurricane Donna—Round-the-clock voluntary services by members of Philadelphia Electric's Radio Club provided the Company with invaluable up-to-the-minute reports on Hurricane Donna's damage to power facilities in the Southeast, its wind velocity, and deviations in the storm's path.

Club members manned their station K3LDD throughout this critical period. This is an activity of the P. E. Employees Association and the Company had assisted the club in obtaining adequate equipment and space for their station; which went on the air late last summer. It works all amateur frequencies, either voice transmission with both amplitude modulation and single side band, or code.

Members of this club were aware of the frequent lack of specific reports on the effects on utilities to the south of them as previous hurricanes moved up the East Coast. They reasoned that through their station much useful information on Hurricane Donna could be procured from neighboring "ham" operators who spoke power-system language, and contacts were made with similar groups in other utilities. Thereupon the club offered its services to the Company, insofar as its license permitted, which meant that all operations would be on a voluntary basis.

This service began with monitoring of Florida's ham station networks. As Donna moved northward, the club monitored U. S. Navy storm advisories to commercial ships at sea, and amateur networks in Virginia and Maryland and, on occasion, asked for specific information. If the network control station could not supply this information, it subsequently granted clearance for a direct contact between the P. E. station and a network member who did have the required data.

Although information received by K3LDD sometimes duplicated that obtained from conventional weather report sources, it was generally in advance of these sources and contained sufficient additional authentic information to make the entire operation worthwhile.

P. E.'s experiment showed definitely that amateur stations, particularly through their volunteer net-

works, can provide an important service in times of emergency. Their effectiveness could be increased substantially were the ham operators of other utilities to be mobilized for greater participation. EL&P will be happy to publish any suggestions as to how this can best be accomplished.

"Power In Our Lives;" An Aid-To-Study Guide For Teachers—Our students at the elementary and secondary-school level stand to benefit in large measure through use by their teachers of a new school program which tells of the important part electric power plays in modern living and the contributions which the electric industry has made to modern civilization.

This new program, titled "Power In Our Lives," has been developed by the Paul S. Amidon organization of Minneapolis. It represents the composite thinking of classroom teachers, school administrators, specialists in social studies, and personnel from a number of electric companies. The initial steps in development included testing experimental units in selected schools in Iowa, Wisconsin, and Minnesota.

Out of these joint efforts has come a source book plus supplemental teaching charts. The problem-solving technique is utilized to encourage research by pupils and the kind of thinking and evaluating that are essential for intelligent living in this scientific age.

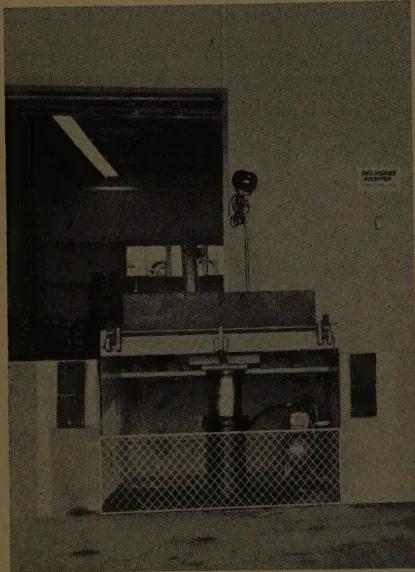
This new program is now being made available, as a public service, to educators in territories served by a number of our power companies, among them Southern California Edison, PG&E, Arizona Public Service, Northern States Power, Wisconsin Power & Light, and Detroit Edison.

Here's a program that deserves the enthusiastic support of many more of our power companies. As their number increases so will the over-all effectiveness of this new program be enhanced.

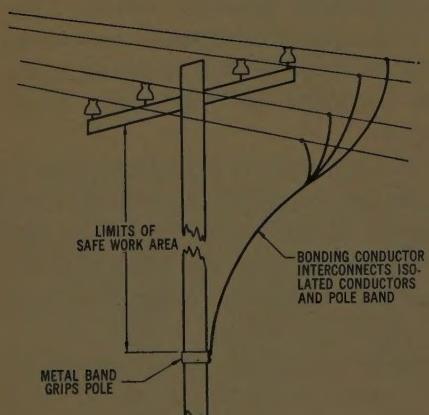
Publisher and Editor

CL&P

ELECTRIC LIGHT AND POWER



Hydraulic level dock in new central warehouse of CL&P reduces truck-loading time.



This is a proposed solution for safely grounding de-energized wood-pole lines. The object here is to keep all parts of the pole and conductors within the work area at the same potential.

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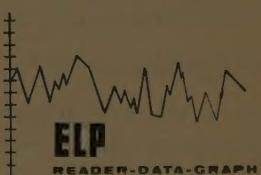
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OUR COVER

Linemen are completing the dead-ending of the special 2.32-in. expanded ACSR that Alcoa designed and fabricated for G-E's 750-kv prototype transmission line. The large pendant weights are special devices related to test evaluation—and are not an exotic new damping device.

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Stainless Steel Ups Condenser Tube Life 300% 54

Experience with stainless steel condenser tubes indicate longer life, better performance, less corrosion and easier installation at Rivesville Station.

By ERNEST R. LONG, Test Engineer, Monongahela Power Company

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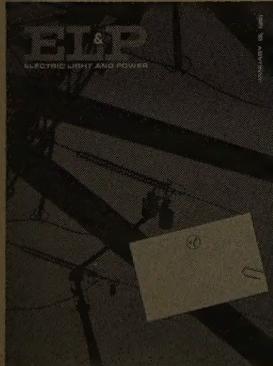
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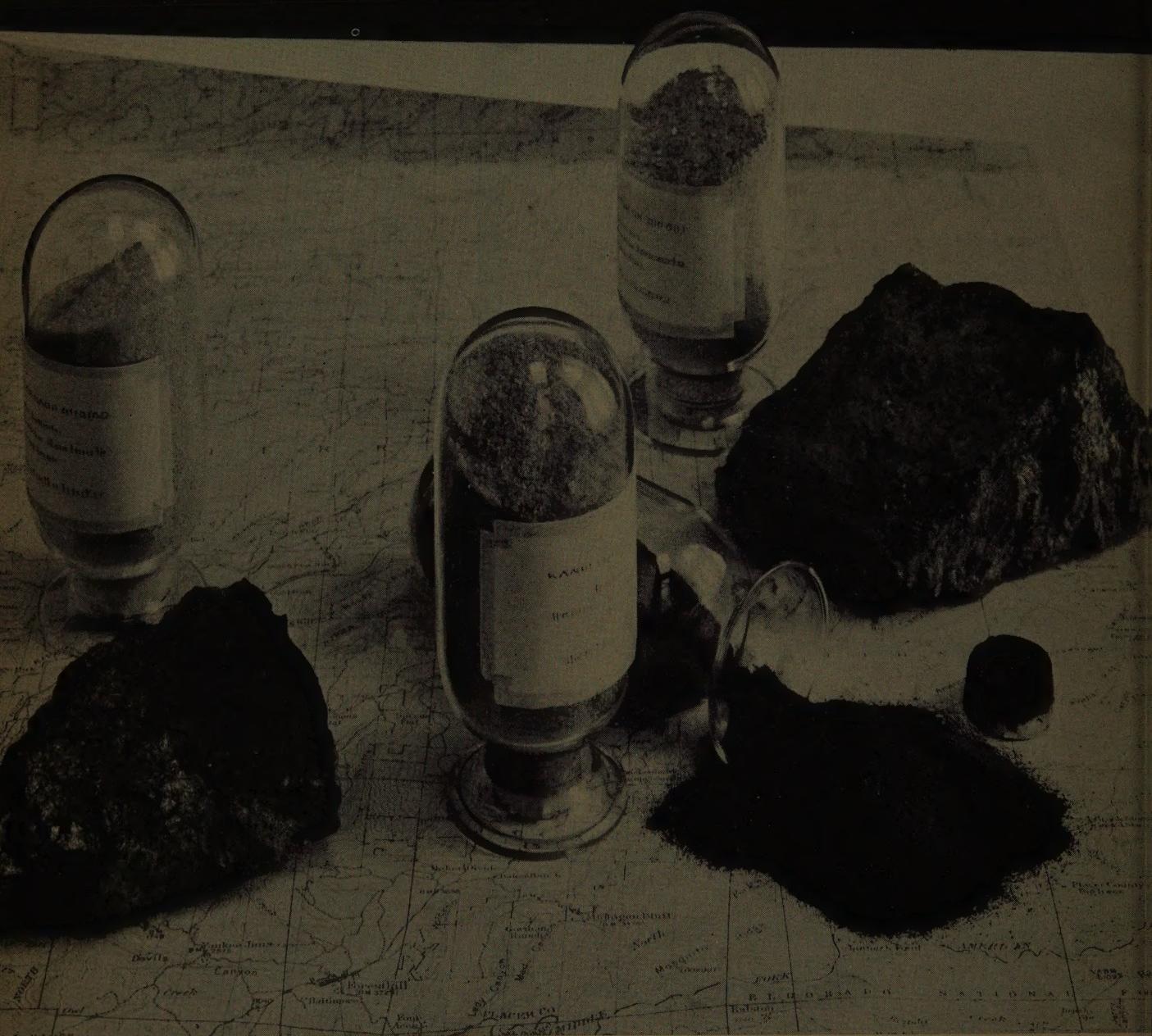
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Pre-Engineering by KAISER ENGINEERS

answers basic plant expansion questions...



Raw Materials?

Your final decision to expand or build results from a series of important individual decisions. Raw material availability is one of them. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. In addition, KE designs and builds all types of power plants—steam-electric, gas-turbine, combined cycle, nuclear and hydro-electric. Whatever your requirements...from Pre-Engineering analyses through plant design and construction...Kaiser Engineers brings worldwide experience and ingenuity to their solution.



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LIGHT AND POWER LINES

Our Electric Light And Power Industry Stands At The Crossroads, As Does Our Nation—As the new Administration moves into office our nation is beset with grave military and economic problems abroad, seriously aggravated by a faltering economy at home.

Certainly the first year of our "Soaring Sixties" failed to soar. And it will take a tremendous lot of prodding to make 1961 get up and really get going.

Probably no one major industry can contribute as much to this effort as can our own. But it will take bold new advances on all fronts, plus an overdose of interdependence and co-operation among all segments of our industry—utilities and manufacturers alike.

Examination of the plans of our electric utilities for further expansion of their physical facilities during 1961 shows a substantial acceleration in pace over 1960. Much of the slowdown last year was of course chargeable to the slowdown of business generally or, more specifically, the lower rate of load increase than anticipated.

The make-up of the new-construction program of our electric utilities and the power-use picture at present and for the long-term are spelled out in detail in the feature forecast section of this issue. A wealth of charts and tables graphically portray industry trends and future possibilities in every key area of the industry's operations.

This look ahead reveals a particularly great challenge in the field of loadbuilding—residential, commercial, industrial, on the farm, and in the lighting of our streets and highways. However, major accomplishments in these important areas must be accompanied by such other advances as further system pooling on a major scale, wide adoption of mechanization and attainment of much more efficient operation all along the line.

We are just on the verge of reaping untold benefits from the billions of dollars that have been invested in research and development in recent years, both by our nation as a whole and by our industry in particular. If we can but keep the ground fertile the seeds that have been planted can grow rapidly into

vast new enterprises that can bring unmatched progress and prosperity for all Americans.

Realization of the promise that the future holds for our electric light and power industry is dependent as much on unified and effective action within our industry as it is on the containment and eventual peaceful solution of the international situation.

Much Accomplished; Much More To Come—Disappointing as it was in many respects, 1960 did set the stage for a number of important accomplishments within our industry; accomplishments that are only forerunners of greater advancements already in the making.

Notable milestones that appear on the credit side for 1960 include three "world firsts"—cutting into service the first 460-kv line designed to operate as an integral part of a transmission network; placing in service the first 500-mw steam-electric generating unit; and energization of the first 750-kv transmission research project. Further advancement of the high-voltage underground cable-research project at Cornell University can also be credited to 1960.

These are but surface indications of the vast research and development work constantly going on within our industry, much of which will come to light in 1961 in the form of new products and new projects.

There is no cause to feel that our industry has reached a plateau. In a very real sense we have only started. Perhaps these words of Dr. Norman Hillberry, director of the Argonne National Laboratory, best express our situation: "The things we know we don't know; the things we don't even know we don't know; the things we 'know' that aren't so—these constitute our veritable infinity of ignorance—the basis of a useful, exciting and rewarding lifetime of research."

Here is the challenge for our industry's continued progress.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



Industry prepares for handling bulk power at extra high voltages to meet tomorrow's loads more economically. (Top, 460-kv transmission line; below, 750-kv transformer)



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EL&P CONSTRUCTION FORECAST

THE ELECTRIC INDUSTRY CONTINUES ITS RECORD-MAKING GROWTH.....

The estimated use of electricity in the United States during 1960 was 4716 kwh for every man, woman and child as compared to 1322 kwh per capita in the Soviet Union.

POWER USE: UP 225 PERCENT IN NEXT 15 YEARS.....

All categories of power use will contribute to the Nation's 225-percent total increase over the next 15 years.

MANUFACTURERS APPROACH 1961 WITH WARY EYE.....

Manufacturers cautiously look to 1961 for improvements over last year. While total business May increase, profit-squeeze will continue.

ELECTRIC-UTILITY CONSTRUCTION HITS \$4.6-BILLION FOR 1961—UP 8.9%.....

Reports direct to EL&P from utilities possessing over 81 percent of the total generating capacity reflect optimism for 1961.

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OUR COVER

These linemen are following safe practices by wearing helmets and "covering up" before starting work on congested urban distribution pole. Photo courtesy of the New England Electric System.



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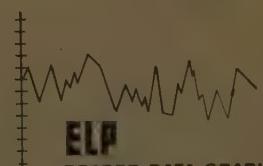
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here it is! A REAL ONE-HAND TOOL

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INSULINK® and LINKIT®
one crimp per end!

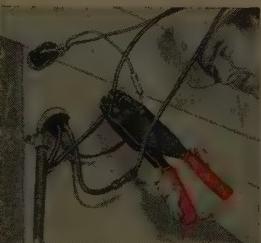
You'll like this ONE-HAND TOOL . . . from start to finish, you can really work it with only ONE HAND. You can close it with less than a 50 lbs. squeeze; it weighs only 2½ lbs. and is only 12" long. You couldn't ask for an easier service tool . . . it's the only *real* ONE-HAND TOOL.

Position the OH25 once . . . and only once . . . on each side of the INSULINK or uninsulated LINKIT. It has a new die that crimps the entire contact area at one time. You don't have to reposition, you can't overlap crimps, and you never make less than the proper number of crimps.

And, it takes only ONE CRIMP PER END . . . a series of easy, ratchet controlled strokes to make a perfect crimp every time. The new dies cause the conductor strands to rub together, removing the oxide film for more stable, low resistance connections.



Insert stripped wire ends into INSULINK; caps grip and hold conductors.



Get up close to your work. Position ONE-HAND TOOL on INSULINK only once per crimp.



A series of easy strokes complete the crimp. Dies produce oxide removing wiping action between conductor strands.

ANOTHER MAJOR DEVELOPMENT IN THE

BURNDY

COMPRESSION PROGRAM



LIGHT AND POWER LINES

Can You Believe It? —A prominent electrical contractor, and a comparatively young one, at that, has become convinced that illumination in excess of 80 footcandles produces prodigious headaches!

Acting on this belief, he has succeeded in several instances in "unselling" general contractors on the need for higher lighting levels, permitting him to get by with a wiring job that is only adequate for 30-foot-candle lighting.

Clearly this contractor is badly in need of the type of educational program the Chicago Lighting Institute conducts for electrical contractors. This is in the form of evening courses but the particular contractor in question is strongly averse to such after-hours activities.

It appears that someone well versed in lighting will need to do a lot of persuading by personal contact with this contractor during his office hours.

If such uninformed and misinformed contractors are not dealt with in some way, they can seriously undermine our industry's educational efforts with the architects and engineers handling office and industrial lighting jobs.

Ironically, the electrical contractor not only is most in need of a working knowledge of what constitutes good lighting but stands to gain the most from such knowledge for the reason that it can be reflected in higher grade, more remunerative wiring jobs for him.

There is a great need for electrical contractors who will sell up, not down. The benefits that can accrue to them and to our industry merit special attention to the challenge exemplified by this contractor with the "headache" complex.

What You Utility Readers Tell Us Is Our Best Guide —During the past year EL&P surveyed a total of nearly 5000 of you utility readers to determine your response to the feature editorial material and advertising we published in four of our 1960 issues. Our purpose was two-fold: (1) to keep our staff informed as to the type of editorial material that

best serves your job interests; and (2) to provide the equipment suppliers with a dependable measure of the effectiveness and value of their advertisements in EL&P.

The information so obtained has proved so valuable to our staff and to our advertisers that this study program is being extended to embrace six of our 1961 issues.

These studies have shown gratifyingly high readership and interest in all of the regular feature items which form the backbone of our editorial sections. They have also shown us your degree of interest in the many different types of feature articles published in the issues surveyed. Thus we can better guide our continuing efforts to obtain for you the type of technical and non-technical feature article material that will be of most immediate and long-range value to you in your own work.

A very special technique was developed for this study program. Most importantly, it permits a breakdown on readership of an entire issue—editorial and advertising alike—by job title. It also demonstrates the degree of reader interest in each editorial presentation and each advertisement. Further, it provides a measure of the action taken by you as a result of reading all of the material published in the issues studied.

Of very great interest to us has been our finding from these studies that you utility readers have a broad range of interest in many areas of utility affairs outside of your own particular field of operation.

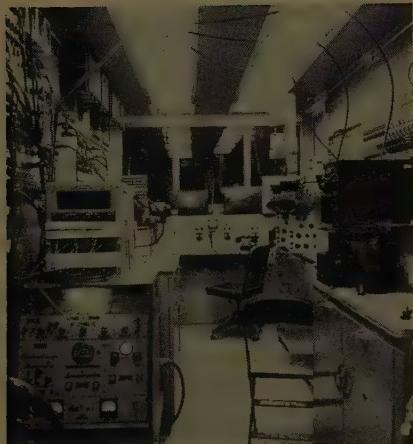
Your magnificent co-operation in furnishing us the very comprehensive information needed for our studies is the essential element in the success of this program. We and our advertisers are most grateful for your help and are confident of your continued co-operation.



Publisher and Editor

EI&P

ELECTRIC LIGHT AND POWER



Interior view of mobile instrumentation and control center used by BPA for power system field tests.



Conductors across a river in Ireland are strung with large corks so that swans can better see the line and, thus, avoid dashing themselves to death.

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Volume 39, Number 4

ELD INVESTIGATION OF BREAKER PERFORMANCE.....48

BPA's tests reveal many pitfalls in operations of circuit breakers.

By E. C. STARR, Chief Engineer and E. J. HARRINGTON, Test & Development Engineer, Bonneville Power Administration

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OUR COVER

When the new era of hydraulic power came, the old one disappeared. Hammer-mills and saw-mills stopped, and water was funneled into canals and pipe-lines to turbines of the new power machines. At the Swedish State Power Board's Malfors Plant, in southern Sweden, the old and the new meet.



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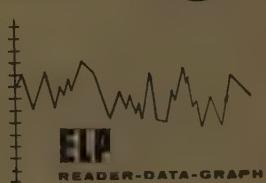
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**Use for Billing or Survey—Visually Interpret or
Automatically Process the Punched Tape Record**

A versatile demand instrument—the Sangamo DDR. This impulse operated block interval demand recorder is ideal for both billing and survey applications.

The permanent punched tape record can be interpreted visually with ease and accuracy or it can be processed automatically. Consider these additional values... pulse saver, kw-kvar-kva functions, tape record visible for several hours so you can see peaks and outages right after they occur.

The DDR is available to you now for billing and survey... *whether or not your company has automatic data processing*. Where automatic data processing is not presently used, the DDR provides a permanent record that can be accurately interpreted visually. When processing is automated, the DDR then becomes an integral part of the system.

If your billing or survey data processing is now automated, the DDR method means fast translation. Sangamo's translator permits direct, accurate and economical conversion of tape data. It can be used with your present key-punch equipment to produce punched cards, or fast translation service is available from Sangamo at a nominal cost.

SANGAMO DDR

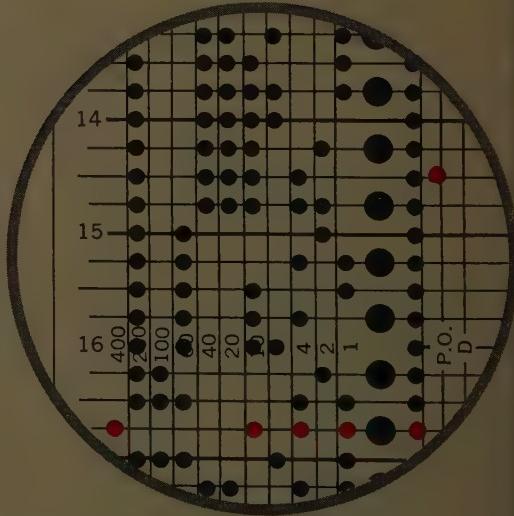
DIGITAL DEMAND RECORDERS



PICK THE PEAK AND READ IT!

The enlarged section of tape at right shows how simple it is... See the punch farthest to the left at 16½ hours? Read it: 400 plus 10 plus 4 plus 1 equals 415. A quick glance at the right-hand side of the tape shows a power outage at 14½ hours. The processed tape provides a permanent *exact* record that eliminates arbitrary interpretations of charts.

The DDR is available for 5, 15, 30 and 60 minute intervals—easily converts from one interval to another. A single roll of tape (15 minute interval) permits three months of continuous recording *yet allows monthly* record removal. Get the complete story from your Sangamo representative or write for Bulletin 360.



SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

Electric Light and Power, February 15, 1961



LIGHT AND POWER LINES

There's Another Side To The Coin — As one ponders the implications of the "price fixing" decisions handed down in Philadelphia it becomes clear that there is much more to this situation than just the administering of punishment to the offending companies and individuals.

Such harsh action cannot help but deal a body blow to the whole "free enterprise" concept . . . and could lead us one step further down the road to socialism.

In its total effect, this action condemns an entire industry and seriously undermines public confidence in all industry.

It is most unlikely that the general public will take into account the fact that even our Federal government condones, and in fact enforces fixed prices in many product lines, more particularly agricultural products. Moreover, government exempts trade unions from any application of the anti-trust provisions governing monopolistic practices.

As one discerning business man pointed out in a letter to the editor of The Wall Street Journal, governmental bureaus fix the price per cubic foot of gas the housewife consumes, the price of every airline ticket we buy, every piece of freight we ship. There is barely a phase of our economy, the writer continues, that escapes the firm hand of price fixing and control by some government agency, association, or union.

Summing up similar comment on its editorial page, The Chicago Tribune states the case in this fashion:

"Federal concern for the preservation of the free enterprise system would be a great deal more plau-

sible if the principles were supported in all areas of the economy and if all violations were treated on an equal and objective basis. But when the government sends some men to jail for an offense to which its eyes are closed elsewhere, and when it places its sanction in law on the same sort of behavior in still another sector, then there is reason to be skeptical of its underlying devotion to the principle of free enterprise."

Developments yet to come can have devastating effects on our industry if retribution is carried to the extreme. Damage suits can drag on for years and serve principally to enrich myriads of lawyers. Combined with long delays in establishment of realistic market prices for equipment, they could force some suppliers to go out of business. The net effect could be to lessen competition, the very antithesis of the whole government aim in prosecuting anti-trust violations.

Clearly there is another side to the coin and all concerned will need to look at it long and hard if the aftermath of this whole case is not to do irreparable harm to our entire industry and to our American way of life.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



Mobile substation (2000 kva) used by Austin Municipal Utility at Austin, Minnesota, for reserve, emergencies and as "stand-in" for substations being revised.



Holding power and creep of anchors are measured by this Chance portable hydraulic anchor-test machine.

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By E. C. BAIN, Virginia Electric & Power Company
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Remote switching and monitoring of capacitor banks on distribution feeders proves successful.

By HOWARD C. TYRRELL, Assistant Engineer and ROBERT V. BOWSER, Engineer, New England Electric System



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MODERN TECHNIQUES HELP ANSWER THE QUESTION: HOW MUCH CAN A GUY ANCHOR HOLD? 41

Tests show that creep of an anchor occurs in first few minutes of loading.

By W. L. HOLLANDER, Senior Project Engineer and
 RAY MARTIN, Chief Engineer, Line Construction Materials,
 A. B. Chance Company

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Substation-on-wheels (2000 kva) provides flexibility for distribution substations at 13.8-2.4 kv.

By H. J. LAMON, Superintendent, Municipal Power Plant, Austin, Minnesota and THOR G. BANK, Electrical Engineer, Joseph V. Edeskuyt & Associates, Minneapolis, Minnesota

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OUR COVER

San Diego Gas & Electric's new South Bay Power Plant, pictured on our cover, features outdoor construction, an innovation for this company. Its 142-mv No. 1 unit was placed in service in mid-1960 and a second unit of like capacity, now being installed, is scheduled for operation in 1962.



Business Publication
Audit of Circulation, Inc.



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Member: Atomic
Industrial Forum



get the inside story on this aluminum

DOUBLE ACTION LOW COST DEAD END CLAMP

Deep snub-wedge action provides maximum holding strength.



Cross section drawing illustrates the compression action of V-groove increasing the connector's holding strength.

Type CUW-R

Range: #4 ACSR thru 836 ACSR and #2 thru 715.5, all aluminum

OTHER FEATURES INCLUDE:

- Saddle has captured U bolts—can't be installed backwards.
- Lifting eye and side pulling eye standard on all sizes.
- Cable can be threaded into clamp without removing cap.
- Compact design—easily covered by line hoses.
- Humback cotter pin and headed clevis pin...easy to work "hot."

for further details write BURNDY, Norwalk, Connecticut or Toronto, Canada.

BURNDY



LIGHT AND POWER LINES

Reader Audience Is Of Prime Importance To Our Authors—Those who author feature articles published in EL&P are vitally interested in the makeup of the reader audience they are reaching through these pages. Thus they deserve to know specifically the qualifications of the people for whom they are writing.

There are in excess of 20,000 regular recipients of EL&P directly engaged in some phase of electric-utility operations, all in executive or supervisory capacities.

Organizations reached through EL&P include all investor-owned power companies, Federal Power Authorities, rural co-operatives, and municipal bodies, plus engineering and management service companies, contracting and construction companies specializing in electric-utility work.

Managers and engineers of the industry's national and regional associations, state and Federal regulatory agencies and commissions are also included in our reader audience.

Here's how the EL&P reader audience divides up numerically:

Management and staff	2260
General executives	4164
Engineering executives	4235
Operating executives	5634
Commercial executives	1643
Rural co-op executives	1048
Consultants and contractors	897
Associations, commissions, libraries, and colleges	654

It is particularly important to also point out that nearly 99 percent of these recipients receive their copies addressed to them individually by name and title.

Reader studies conducted throughout the 38-year period EL&P has been published show that each copy received by an individual has a pass-along readership which averages about four additional people. Thus our authors are reaching approximately 100,000 key people in the electric-utility field when their articles appear in EL&P.

No Holds Barred On Bulletin-Board Treatment—Complete frankness in posting the news, be it good or bad, marks Pennsylvania Power & Light's approach to keeping its employees informed on company operations.

A case in point is its handling of the news of the recent winding failure on an 87,500-kw generator at the company's Sunbury plant.

Through the medium of some 500 bulletin-board posters at work locations throughout the company's service area, concise information was provided as to the nature of the damage, what was being done about it, the outage time, and the cost to the company.

Advantage was taken of the opportunity to point out that despite this very sizeable outage no customer was forced to curtail the use of electric service in any way. Three major factors were credited with making full service possible: adequate generating reserves, adequate interconnections within its own system, and interties with its neighboring utilities.

In this way, all employees are made prideful of the fact that PP&L is an integral part of one of the largest fully-integrated electric-service grids in the world—the Pennsylvania-New Jersey-Maryland interconnection.

Publisher and Editor

ELP

ELECTRIC LIGHT AND POWER



This grating in the sidewalk does not cover an air duct to a transit subway system. It is a grating cover for an underground capacitor installation in Philadelphia.



This is the computer center for Northern States Power Company where all billing operations for the Company's 18 divisions are handled.

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By R. D. FURBER, Director Information and Advertising, Northern States Power Company

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Underground capacitor installations are found to be practical and economical.

By C. E. NELSON, Superintendent, Engineering Division, Transmission and Distribution Department, Philadelphia Electric Company

FREQUENCY-ZERO MEANS NO ACCIDENTS.....

The safety program should be a part of the original planning of a job.

By S. M. SHARP, Vice President, Engineering-Operations, Southwestern Electric Power Company

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PRODUCTIVITY RECORDS LEAD TO BETTER CREW MANAGEMENT, PERFORMANCE 60

Knowledge of work-crew performance is valuable when preparing budgets.

By C. E. MONFORT, JR., Manager, T & D Construction, T & D Construction Department, Union Electric Company

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This plant was built completely underground in solid rock.

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OUR COVER

An engineer studies blueprint of Cochrane Dam, named for the Montana Power Company's chief consulting engineer, Harry H. Cochrane, on the Missouri River near Great Falls, Montana. Plant, now completed, has nameplate capacity of 60,000 KW and brings to 220,000 KW the total capacity in five Montana Power dams in this stretch of the Missouri River.

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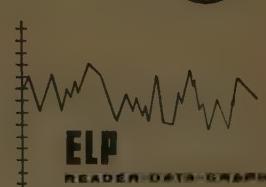


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NO MORE ENGINE IDLING



...with **NEW MOTOROLA** **MOTRAC*** 2-way radio

Idle a truck engine 4 hours a day—to regenerate for battery drain due to 2-way radio—and you waste *more than a hundred dollars a year* in gasoline alone! Add the cost of engine wear, replacement batteries, generators, etc., and you've got a significant cost leak.

But now it's *unnecessary*. Motorola MOTRAC radio uses only a trickle of current—less than a dome light—so engine idling is *out*. And that's just the *start* of MOTRAC radio savings. Truly advanced design and rugged construction give you greater *reliability*, and much longer life. Here is truly dependable equipment for long-run economy.

It's a big story. Get all the facts about this outstanding new radio. Call or write today.

HERE'S THE INSIDE STORY—Commonest source of maintenance problems—vibrators and receiver tubes—have been replaced by dependable transistors. MOTRAC radio can be used with any 6 or 12 volt vehicle—positive or negative ground. Models available with up to 100 watts power output.



MOTOROLA 2-WAY RADIO

Motorola Communications & Electronics, Inc., 4501 Augusta Blvd., Chicago, Ill. 60629 Subsidiary of Motorola Inc.

*MOTRAC is a trademark of Motorola Inc.



LIGHT AND POWER LINES

The Enigma Of The Government-Business "Alliance" — "Your success and ours are intertwined," said President Kennedy in sizing up the interrelationship between the Federal Government and American business enterprises, in his recent address before the National Industrial Conference Board. Last year's \$6-billion drop in corporate profits, he pointed out, cost the government more than enough tax money to pay for its whole health and education program in 1961.

Then along came President Kennedy's Interior Secretary, Stewart L. Udall, with the statement that "We are not out searching for ways to let private industry have access to major hydroelectric sites and to the falling water at some of the dams built with Federal funds." Making it plain that the Federal Government is back in the electric-power business in a big way, his pronouncement spells trouble for all investor-owned power companies. And so does the later indication by Mr. Kennedy, in his special message to Congress on natural resources, that his administration intends to meet what it considers a federal utility responsibility.

Now a five-state, all-federal transmission system to carry to preference customers the 1.2-million kilowatts of power to come from hydro plants of the Colorado River Storage Project has been approved at the highest administration level. It is the key link in a federally-dominated giant power grid envisioned by the late Leland Olds in the 1930's and still the goal of a crusade by his disciples. As pointed out by Ralph Elliott, our Washington Editor, in his Washington Outlook comments in our Mar. 1, 1961, issue, this giant power grid idea has long since

passed the dream stage and is moving grimly close to reality.

The inconsistency of our government's statements and actions in the entire field of government-business relationship was stated in concise and arresting form in a recent letter from one of our readers. He reported a recent conversation with a Hollander who said: "I can't understand your Federal Government. Industry contributes so much to your welfare yet it seems that your government consistently does everything in its power to destroy it. You charge the same price for your products as your competitors and you are charged with collusion. You lower your prices and you are charged with unfair competition. You raise your prices and you are liable to be accused of making an unfair profit. And after all this, if you do make a profit, the government takes 52% of it. I just can't understand your government's attitude toward business."

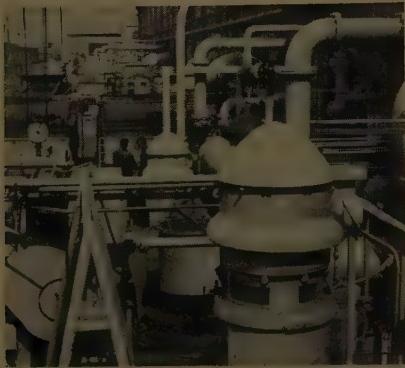
Our EL&P reader concluded his letter with the statement "And I thought to myself: 'I doubt if anyone else does'."

There is little that can be added to so apt a remark except to say that this whole situation has deadly serious implications for all of our American business enterprises — and particularly for our electric-power industry.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



The eight centrifugal water pumps (dome covered) at Silver Gate steam-electric plant of San Diego Gas and Electric Company are overhauled every two years.



Cradle, supporting insulator string 10½ ft long weighing about 250 lb, is being swung in arc up to tower arm where live-line maintenance can be accomplished on 460-kv line.

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Ontario Hydro's 460-kv transmission network will be maintained live.

By T. J. BURGESS, Line Maintenance Engineer,
The Hydro-Electric Power Commission of Ontario

EPOXY RESIN REPAIRS SAVE PUMP DIFFUSER SECTION \$.....

Water pump erosion/corrosion damage is repaired by epoxy resin.

By STANLEY ROGERS, Maintenance Foreman,
Silver Gate Station, San Diego Gas & Electric Company

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HOW 300-KV SUBMARINE CABLES WERE LAID ACROSS THE OSLOFJORD

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Underwater joints were eliminated by manufacturing the cable in 6890-ft lengths.

By C. W. HIRSCH, Chief Cable Engineer,
Standard Telefon og Kabelfabrik A/S
and Dr. JUST K. QVIGSTAD, Chief Engineer, A/S Hafslund, Norway

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OUR COVER

Sikorsky helicopter transports aluminum transmission tower to site over rugged, wooded terrain. Guy wires were attached to tower at assembly point and lashed to it during its one and one-fifth mile flight. Photo courtesy American Electric Power Service Corporation.



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ELP

READER-DATA-GRAFH

TAPIT

connects Aluminum to Copper...
*better... for 35% less**

Type UC-R

Field experience and extensive tests have proven that the massive aluminum TAPIT design withstands effects of galvanic corrosion better than copper-bushed or plated aluminum connectors on aluminum to copper conductor combinations.

*Massive aluminum design also... by eliminating need for copper bushings or special plating... saves at least 35% in cost of connectors for aluminum to copper.

Only five sizes required for joining any conductor combination in #8 thru 400 Mcm range. Stocking is simplified... TAPIT can also be used on aluminum to aluminum. Also available with PENETROX sealed in with STRIPSEAL.

Ask your Burndy representative how you can save 35% on aluminum to copper connections—and get better connections—or write directly to Burndy, Norwalk, Connect., or Toronto, Canada.



MASSIVE ALUMINUM TAPIT MINIMIZES CORROSION. The larger the mass of aluminum (anodic) compared to copper (cathodic), the less the galvanic corrosion in an aluminum-to-copper connection. Note massiveness of aluminum TAPIT connector in relation to copper conductor.

TAPIT® another engineered solution to your connector problems by
BURNDY

Norwalk, Connect.

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LIGHT AND POWER LINES

Are You A Member?—If not, you are one of the reasons why the United States holds only 11 percent membership in the international technical association commonly referred to as C.I.G.R.E.

Membership costs only \$12 annually and the benefits are manifold.

Our country makes extensive contributions to power-engineering technology and yet we do not maintain commensurate membership in this important "International Conference On Large Electric High-Tension Systems."

Here is the present U. S. membership in C.I.G.R.E.:	
A. Representatives of electrical manufacturers	103
B. Representatives of electric utilities	92
C. Representatives of consulting firms	53
D. Representatives of Fed. groups—USBR, Corps of Engrs., Dept. of Commerce, BPA, TVA, Dept. of Interior, ICA	23
E. Representatives of technical universities	12
F. Representatives of the technical press	7
G. Representatives of the Edison Electric Institute and the Association of Edison Illuminating Companies	4

For their modest annual dues, U. S. members are not only privileged to attend the biennial C.I.G.R.E. conferences in Paris—a highly rewarding experience—but are furnished without extra charge a complete set of the papers prepared for these conferences.

The papers are made available to members sufficiently in advance of the conferences to permit preparation of discussions, which are presented at the conferences following a very brief resume of each paper.

U. S. members receive copies of all papers regardless of whether or not they attend the Paris meetings.

Additional U. S. members would be welcomed by this important international association and would enhance the stature of the United States in

C.I.G.R.E. activities.

Anyone interested in becoming a member may contact W. S. Price, secretary-treasurer, U. S. National Committee, C.I.G.R.E., 2 Broadway, New York 4, N. Y., Room 1054.

With over 2500 power engineer members from all over the world, C.I.G.R.E. is the only international organization which provides a forum for the discussion of all technical problems associated with the design, construction, and operation of electric power systems.

Better realization of the worth of the C.I.G.R.E. activities to U. S. organizations and individuals alike should stimulate a healthy growth in U. S. membership.

It Was The Capstone Of A Vast Pyramid Of Effort
—Just 75 years ago, 23-year-old Charles Martin Hall hit upon an idea that was destined to make him rich and famous beyond his wildest dreams.

The setting was a rude backyard laboratory adjoining his home in Oberlin, Ohio. His long-sought objective was discovery of a commercially practical process for producing aluminum electrolytically.

Discover it he did; and just how he accomplished it has been dramatized in magnificent fashion in the January-February issue of Kaiser Aluminum News.

Important events that helped set the stage for Hall's historic discovery are traced in this special 32-page issue. Thus his accomplishment may be seen in the perspective of more than 7000 years of man's efforts to free and shape the metals of the earth to his use.

It all makes most fascinating reading.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



C. J. Foresberg, WP&L president, is signing power pool agreement while H. P. Taylor, WPS president, G. S. Meyrick, WPS vice-president, and J. D. Howard, WP&L vice-president, "observe."



These Globe-Locust trees on a Cleveland street are six years old and will mature at 16 ft. They present balance and symmetry, yet require no trimming to clear wires.

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This pumped-storage hydro plant is in effect an enormous a-c storage battery.

By GEORGE S. WHITLOW, Planning Engineer,
Union Electric Company

POWER POOL HAS "FLYWHEEL EFFECT" ON
INCOME STATEMENT 50

Savings are expected to be very substantial and cost-sharing of new units should be very beneficial as a result of this power pool.

By J. D. HOWARD, Vice President, Wisconsin Power & Light Company and G. S. MEYRICK, Vice President, Wisconsin Public Service Corporation

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ARBORIST CALLS UTILITY-SPONSORED TREE PROGRAM "BEST IN WORLD" 53

The correct tree is good business for both the municipality and the public utility.

By EDWARD H. SCANLON, Edward H. Scanlon and
Associates, Consulting Arborists

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(joint meeting), and the System Planning
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This is one of the four-circuit towers on the Los Angeles Department Of Water And Power's transmission line connecting the new Scattergood Steam Plant with the department's system.

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ALLIS-CHALMERS



Dual-Cooled transformers at Pittsburg, California, Station of the Pacific Gas & Electric Company.

Hidden transformer capacity uncovered!

Dual-Cooled* transformers boost emergency capacity 33% without loss of life.

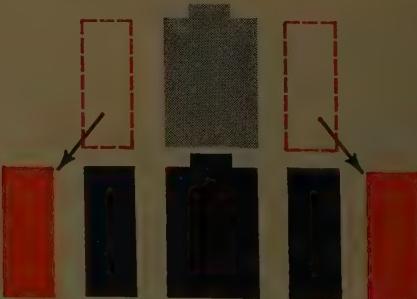
Dual-Cooled transformers — an A-C development — are utilized at this central station to permit two-thirds of the turbine output to be carried in the event one transformer is off the line. In an emergency, cooling equipment from both units is connected to the functioning transformer. Result: Capacity of either unit with dual-cooling is increased one-third over its normal rating.

For substations under gradual load growth conditions, the *Dual-Cooled* transformer capacity bonus can defer purchase of additional units. Smaller transformers can be installed without paying for little-used standby capacity. You save on installation costs, on real estate, fencing, concrete and taxes.

Dual-Cooled transformers are available in any rating from 20,000 kva up. Contact your conveniently located A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

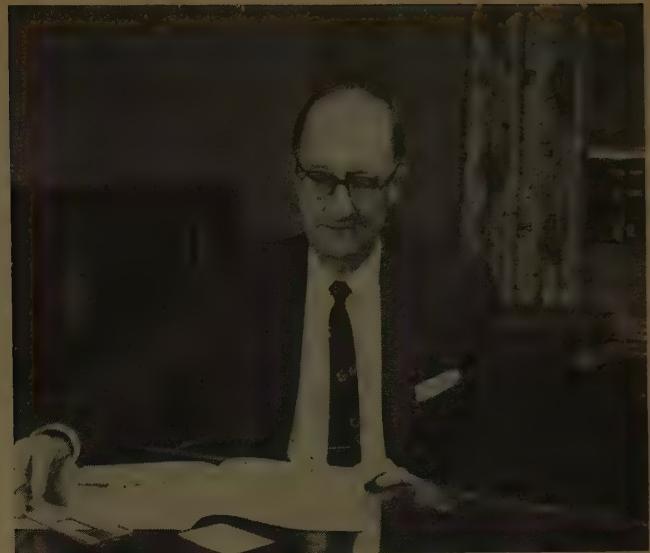
**Dual-Cooled* is an Allis-Chalmers trademark.

A-1426



Another method of dual-cooling is the physical transfer of coolers from one transformer to the other.

LIGHT AND POWER LINES



The Stalemate In Adoption Of Higher Service Voltages Can Be Costly—One of the most unfortunate stalemates in national committee action has been reached. Its economic significance transcends any research endeavors that are front-page news. The issue at stake is EEI-NEMA agreement on higher voltage levels for utilization and secondary systems.

Six years of research and deliberation by both the manufacturing and utility industry brought forth two possible plans for nominal service voltages. Spearheading this work was the Joint EEI-NEMA Committee on Higher Utilization Voltages.

Two years have now passed since this Joint Committee issued its tentative recommendations on higher secondary and utilization voltages. There the matter stands, with no apparent prospect of early joint action to revise present voltage standards.

A summary analysis of this baffling situation is given in the article titled "What Service Voltages in the Future?" which appears in this same issue. This article clearly sets forth the developments that have led up to the present industry stalemate.

Apparently this stalemate will not be broken until top management in both NEMA and EEI fully realizes the costly implications inherent in this situation.

The controversial subject was settled in Great Britain and most European countries by governmental action. Even if governmental action were possible it would not be welcome in this country. In our free enterprise system, however, it would seem logical to free both the 240-volt-to-neutral and the 265-volt-to-neutral systems from standards and wiring code limitations so that full economic advantage may be taken of their inherent advantages. In other words, make both systems standard, standardize equipment for both systems to the same extent, and change the National Electrical Code to permit branch circuits under 300 volts-to-ground to be used in dwellings and commercial establishments.

If a utility can adopt a system of higher level

utilization voltages that can lead to an ultimate of three service voltages and three equipment nameplate voltages rather than one leading to five service voltages and seven nameplate voltages, then the first system should be given primary consideration. This in effect is what many utilities prefer. However, a compromise of accepting both systems seems to be the solution to the present dilemma, since it should lead to the simpler system eventually.

Industry Agreement Is Urgently Needed Elsewhere, Too—There are units with the secondary compartment on one end and the primary compartment on the other end. There are designs with the primary compartment on the front of the unit and secondary compartment on the side. There are cabinet doors hinged at the side, or the top, and lift-out type doors. There are sectionalizing and fusing devices that vary over a wide range of load-break ability.

Put them all together and they serve a common purpose—to provide self-contained, surface-mounted transformer units for use with low-cost residential underground distribution systems.

It is recognized by manufacturers and utility engineers alike that these units are now in an evolutionary stage. At the present time there are three separate task forces studying equipment, construction practices, and economics.

Rich rewards for all await the flexibility and interchangeability that will come with standardization of these units. Thus the task forces deserve the industry's full support and everything possible should be done to expedite their work.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



This is a sample of the construction necessary to provide "Integrated Environment" in RG&E headquarters building.



Artist's version of Union Electric's pumped-storage plant—Taum Sauk.

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Development of the reversible pump-turbine provided the answer for storing off-peak kilowatthours.

By G. J. VENCILL, Chief Hydraulic Engineer,
Union Electric Company

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The economic limit for 120-volt service voltage is being approached at a very rapid rate.

By A. S. ANDERSON, Electrical Engineer,
Ebasco Services, Inc.

RG&E CREATES INTEGRATED ENVIRONMENT IN HEADQUARTERS BUILDING 51

A one percent increase in employee efficiency will offset costs of new lighting-heating-air conditioning system.



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Service outages and poor voltage regulation are alleviated by installing 2000-kva diesel generating unit.

By RAY APPLEMAN, Project Engineer,
 Public Service Company of Oklahoma

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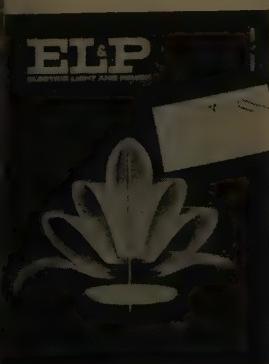
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OUR COVER

"The Strange Story of Light" as produced by the Duro-Test Corporation. Photo courtesy Kansas Power and Light's employee magazine "Service."



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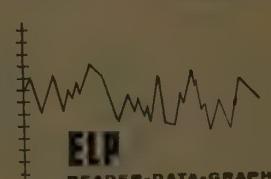
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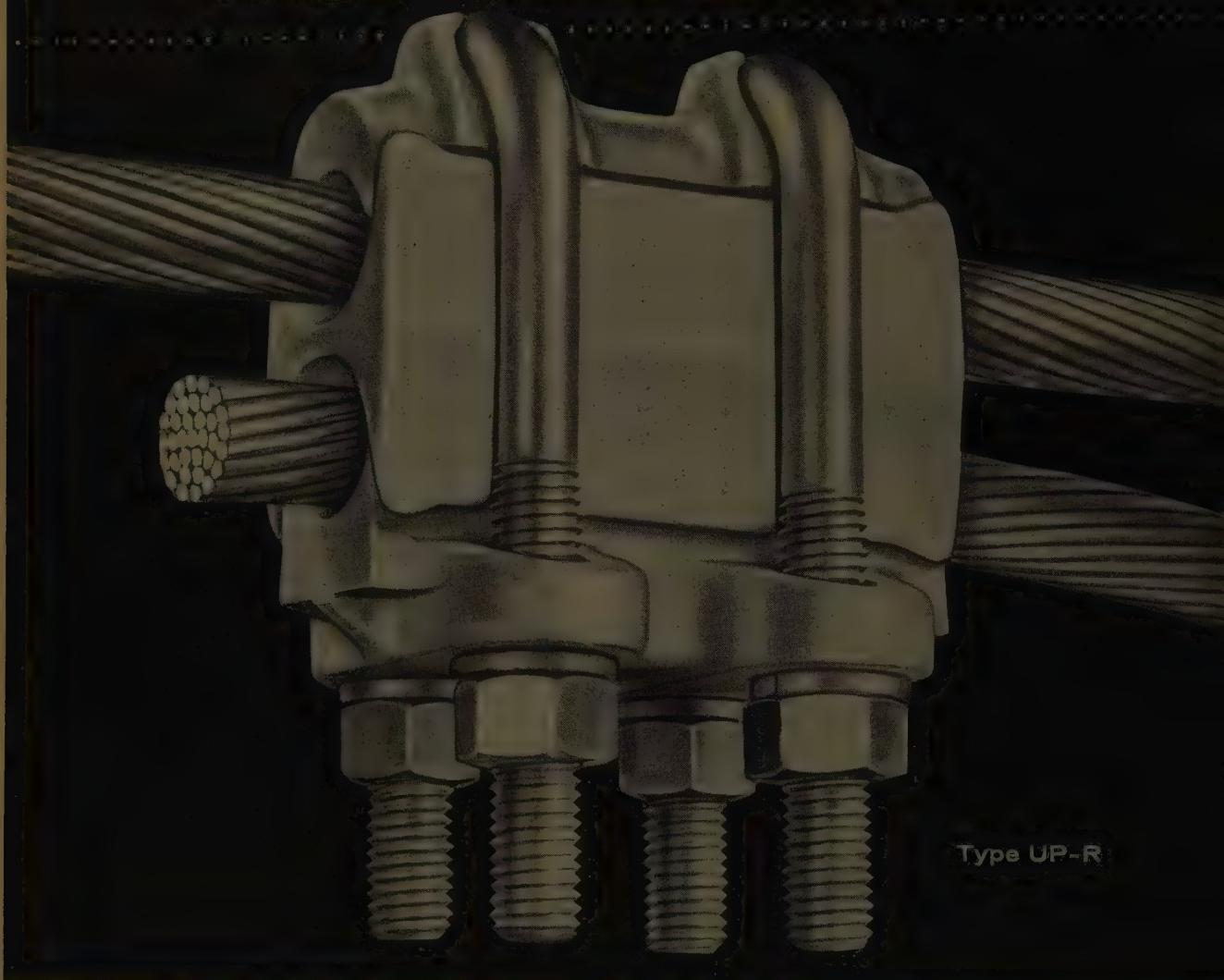
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where **POWER** counts
in transmission and primary distribution



Type UP-R

COUNT ON

Heavy duty all-aluminum construction that offers overload protection • Modified V-grooves that assure good conductivity and cable wiping, and minimizes cold flow • Massive aluminum design that reduces galvanic corrosion • Belled mouths that prevent cable chafing • Three sizes that cover ranges from 3/0 through 954 aluminum and copper—110.8 through 795 ACSR.

Write for further details.

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58-25

LIGHT AND POWER LINES



The Challenge: Will an unbiased appraisal of existing power facilities and detailed technical study support the proposed Federal power grid or reveal other measures which would better accomplish the objective?

Growth of transmission facilities must be closely coordinated with the economics, not alone of the immediate area they traverse, but also with the interconnected regional network of which they are a part, and with adjacent networks.

The proposed power grid will not appreciably increase the availability of generating capacity. Transmission losses incident to long-distance transmission also are an appreciable amount that is reflected as a net loss in power capacity available.

A transmission system becomes relatively useless unless somewhere in the area it covers there is excess generating capacity that can be relayed to points where deficiencies develop.

Even with a high degree of interconnection, maximum economy in operations is obtained by attempting to make each major consumer area within the grid self-sufficient as regards generating capacity.

The present networks were built to take advantage of the economies available through interconnection and serve that function well.

Arbitrarily to interconnect important cities with a new transmission system merely because they are large centers of power consumption will not withstand the unbiased scrutiny of engineering analysis.

The social and political implications surrounding the proposed construction of a government-owned transmission system alone are of sufficient importance to warrant considerable additional technical study and public discussion.

Once the government has a transmission network to accompany its power producing facilities, the

transition to Federal control of *all* production and transmission facilities could be effected readily.

Does all of the foregoing sum up to a sound argument against the giant power grid idea now being promulgated in Washington circles? Yes it does. And it was equally sound when it first appeared in EL&P over 20 years ago! (See May 1940 article titled "Is Another Power Grid A Logical Defense Measure?")

Repetition now serves to re-emphasize the need for constant vigilance on the part of all private enterprise if our Federal government is to be kept out of the super-power-grid business . . . a business it has no business being in.

Concern For Man Himself And His Fate—With the universe about us so full of so many supersonic possibilities, it seems particularly fitting at this time for all engineers to give new heed to a profound observation once voiced by Albert Einstein.

Prophetically, Doctor Einstein warned that "It is not enough that you should understand about applied science in order that your work may increase man's blessings. Concern for man himself and his fate must always form the chief interest of all technical endeavors in order that the creations of our mind shall be a blessing and not a curse to mankind. Never forget this in the midst of your diagrams and equations."

If man is to survive, all those in high places, particularly the Kremlin bosses, must have this message of Albert Einstein's indelibly impressed upon their minds and consciences.

A handwritten signature in cursive script, appearing to read "S. S. Garrett".

Publisher and Editor

ELECTRIC LIGHT AND POWER

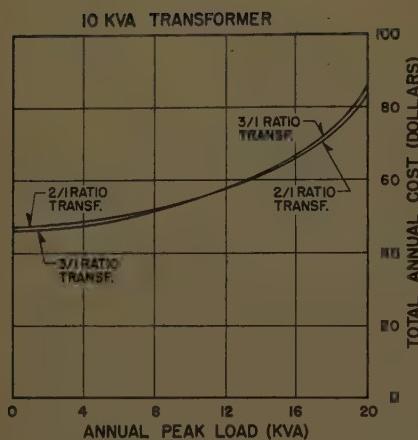


Chart of operating costs for 10-kva distribution transformers vs. annual peak loads.



This shows the result of galvanic corrosion due to the dissimilar compounds of a cable sheath and the wiping solder.

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By WALTER D. BULLOCK, Engineer, Technical Service Division, T & D Department, Boston Edison Company.	

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NEW TRANSFORMER DESIGN OFFERS SUBSTANTIAL SAVINGS 62

Standardization of new design and elimination of many sizes of distribution transformers are expected to provide large savings.

By W. H. JOHNSON, Distribution Engineering Section Head, and W. E. MEKOLITES, Distribution Engineer, American Electric Power Service Corp.

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Reports on 1961 American Power Conference, Southwest Electric Conference, Southeastern Electric Exchange Annual Conference and The World Lighting Forum.

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OUR COVER

This photo shows the type of construction that will be used to complete a long-desired 150-mile, 230-kv tie line between Minnesota Power and Light Co. at Duluth, Minnesota, and Northern States Power Co. at the Twin Cities of Minneapolis and St. Paul. For story see page 56.



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Society of Business
Magazine Editors



Member: Atomic
Industrial Forum





YOU CAN'T WAIT FOR THE WORLD TO BEAT A PATH THESE DAYS

"If a man can make a better mousetrap than his neighbor, though he builds his house in the woods, the world will make a beaten path to his door."

With respect to Ralph Waldo Emerson, competition being what it is in the twentieth century, Southwire has pressed his advice a step further. We have not only endeavored to make better products, but we have also succeeded in . . .

- Operating the industry's largest fleet of trucks for fast delivery to customers' warehouses and jobsites.
- Maintaining flexible manufacturing schedules to meet needs of customers on short notice.
- Pioneering continuous aluminum casting.
- Developing the first 11,000-pound coil of aluminum rod.
- Developing new products through basic research—including 100% free-stripping Neoprene.

- Acquiring a list of loyal customers, of whom we are justly proud.

That our customers have benefited from these achievements is borne out of their use of Southwire products and the consequent growth of our company, which is 25 times larger today than ten years ago.

Specify Southwire and we'll beat a path to your door.

Southwire Company



Carrollton, Georgia — TERRACE 2-6311

LIGHT AND POWER LINES

Profits Mean Progress—A company with good profits adds more new plant. Its sales go up faster. It hires more new people. Therein lies the role of profits as it relates to growth and development in our American economy.

To successful businessmen, this is axiomatic. And yet there are some government regulators of utilities and other regulated industries that apparently need to be convinced of this. Witness the recent issuance by the Cleveland Electric Illuminating Company of a small folder designed to sell this basic idea to those who are inclined to assume that healthy utility profits can be achieved only by gouging a hapless public.

This new folder presents highlights from a study of 50 companies and nine major U. S. industries. Its key finding is that a company's performance and progress depend on its ability to earn a good profit.

As stressed in this new folder, the link between profit and performance is just as close in regulated as in unregulated industries. Thus it is essential to find a way to inject research and innovation into the life blood of regulated industry through a healthy climate of good profits.

This is especially true under present conditions, with the power companies subjected to growing pressure to conduct more research and development. A good start has been made in this area but the possibilities for accelerated advancement by this means are boundless.

There is much food for thought in CEICO's summary statement that in the future, regulated industry will be most progressive and serve the nation best when research, new products, management freedom and profitable operation are encouraged.

Action To Light Our Highways Is Roadblocked—In 27 of our 50 states the lighting of highways is left to chance. Why? Because these states do not have legislation that will allow state funds to be spent for highway lighting.

Thus there exists a serious roadblock of confusion as to responsibility for providing highway lighting, together with confusion as to where highway lighting should be planned and how much should be used.



Night-time accidents on our unlighted highways account for an economic loss to our nation that is staggering. The vicious spiral of rate increases for automobile insurance continues to drain away our corporate and personal resources.

Clearly a massive crusade is needed to bring about legislative action that will allow all of our states to spend their funds for highway lighting. Active and enthusiastic backing by all of our electric utilities, both investor-owned and government-owned, could contribute in large measure to the early success of such a crusade.

Electric vs. Gas—How Goes The Battle?—Analysis of 1960 factory unit sales of three major load-building electric appliances compared with sales of their gas counterparts throws light on an interesting situation.

These appliances are the ranges, water heaters, and dryers being featured by EEI in this year's "Flameless" advertising program.

There was a standoff in 1960 in the battle for increasing the ratio of electric vs. gas ranges. As late as 1952, gas ranges were outselling electric by 2.05 to 1. Now the score is close to 1 for 1, thanks in part to the advent of built-in models of electric ranges.

Free-standing models of both electric and gas ranges still represent almost 70 percent of all ranges sold. The ratio was 1.74 gas to 1 electric free-standing range in 1960.

There was no significant change in the ratio of sales of electric vs. gas clothes dryers during 1960.

But water heaters continue to be the problem child of the electric industry. The ratio of gas to electric models was almost 4 to 1 last year. Ten years ago this ratio was only 2½ to 1.

This water heater record points up the need for a further gain in the number of utilities approving "quick recovery" models, the lengthening of charging hours, better rates, more advertising and greater sales efforts.

A handwritten signature in black ink, appearing to read "J. B. Garrett".

Publisher and Editor

CL&P

ELECTRIC LIGHT AND POWER



This is the small superstructure that serves as an entrance to CL&P's underground dispatching center.



Typical three-phase autotransformer installation located at Bluemound Substation of Wisconsin Electric Power Co.

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NEW UNDERGROUND DISPATCHING CENTER RESISTS
RADIOACTIVE FALLOUT 34

Center is designed to resist the danger of radioactive fallout and is equipped to enable entire staff to live comfortably for 14 days of isolation.

By W. H. WELLS, Dispatching Superintendent,
Connecticut Light & Power Co.

SAVINGS CAN BE REALIZED BY PROPER APPLICATION
OF AUTOTRANSFORMERS 38

If the ratio of HV to LV is three or less an autotransformer is usually more economical than a two- or three-winding transformer.

By LEONARD R. REID, Supervisory Engineer, Transformer Department, Allis-Chalmers Mfg. Co., Milwaukee



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WATCH PHASE DESIGNATION IN LOOP CIRCUITS.....41

Care should be taken to choose the least confusing method when designating three-phase looped circuits.

By VICTORY A. KINITSKY, Visiting Associate Professor of Electrical Engineering, Purdue University

INDUSTRY IN CONFERENCE.....42

Reports on Missouri Valley Electric Association's 32nd Annual Engineering Conference, Southeastern Electric Exchange Engineering & Operating Conference and Northwest Electric Light & Power Association Spring Conference.

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OUR COVER

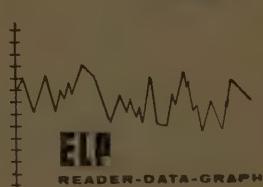
This photograph was taken in the switchyard of a power station in the northern part of Sweden. Photo courtesy Swedish State Power Board.

BPA Business Publication Audit of Circulation, Inc.

NBP National Business Publications, Inc.

Society of Business Magazine Editors

Member: Atomic Industrial Forum



TURBINES:

Shell reveals three ways that Turbo Oils help prevent oil breakdown, rust, sludge and foaming

Small quantities of air and water can work their way into any turbine lubrication system. These contaminants can accelerate oxidation of the oil.

Read how Shell scientists developed a specific formulation that counters this oxidation and brings you turbine lubricating oils with top performance records.

WHEN oxygen attacks turbine oil, it can form peroxides and organic acids. A chain of oxidation reactions begins. If the oil stability is inadequate, sludge can form.

Air entrained in the oil can aggravate oxidation. And it may cause foaming.

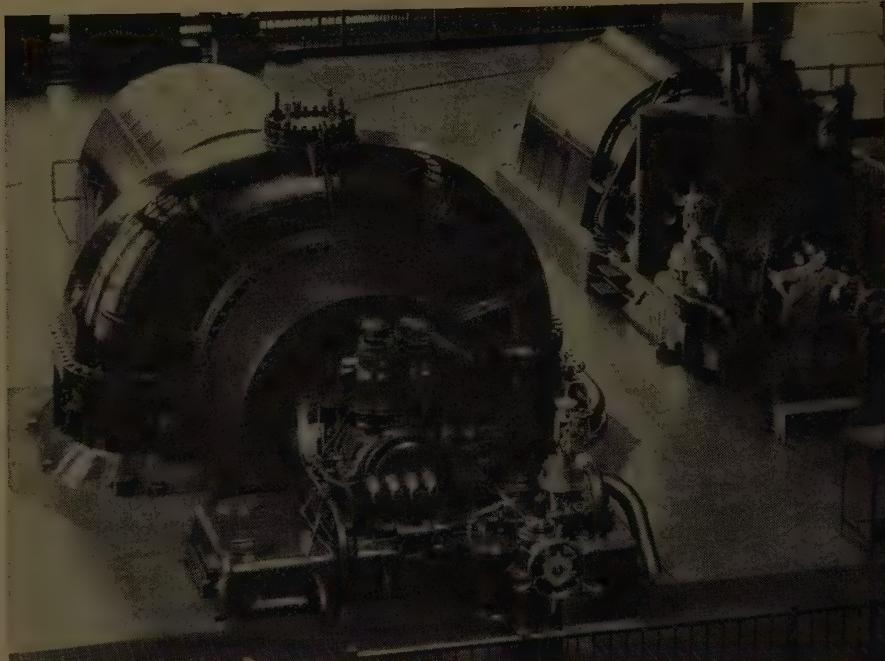
The oil may also be affected by water in the system. Laboratory tests have shown that water can greatly accelerate an oxidation process.

With Shell Turbo® Oil, Shell tackles these problems in three key ways:

1. Shell carefully selects base oils for use as turbine lubricants, then refines them to get the most effective response to Shell's special additives.

2. Shell adds a powerful oxidation inhibitor to its precisely refined base oils. This inhibitor helps prevent the chain of oxidation reactions caused by oxygen exposure at operating temperatures. It helps keep the oil in good condition, and lengthens its service life.

The result is that Shell Turbo Oils have proved themselves unusually stable over long service periods.



Shell Turbo Oils lubricate turbines with total rating of more than 17 million kw in the U.S. and Canada.

3. Shell uses an outstanding rust inhibitor. As a protective measure, Shell uses special additives that cover metallic surfaces with strongly adherent polar-type films.

These films are specially designed to help keep water from the metal surface.

In drastically accelerated laboratory tests, metals immersed in Shell Turbo Oils show outstanding anti-rust performance—even in the presence of sea water.

Ask your Shell Industrial Products Representative for facts on Shell Turbo Oils. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

Memo to utilities

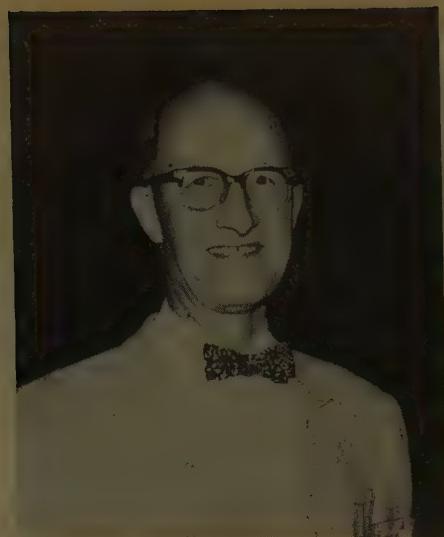
Ten turbines in the U.S. have been running on Shell Turbo Oil 27 since 1938.

In Canada, Shell Turbo Oils lubricate turbines generating more than half of all steam power produced.



A BULLETIN FROM SHELL

—where 1,997 scientists are working to provide better products for industry



LIGHT AND POWER LINES

Why Spend \$136-Million For Unnecessary Federal Transmission Facilities?—At a time when our Federal budget is burdened with so many urgent and vital projects, this amount of money which has been requested by the Bureau of Reclamation for an all-Federal transmission system for the Colorado River Storage Project, could certainly be used more beneficially.

From the evidence at hand, it appears that the Bureau is determined to put this idea across regardless of any economic considerations involved in the alternative plan proposed by the investor-owned power companies serving the five-state area encompassed by this project. (For complete details, see EL&P article titled "Power Facilities in Intermountain Area Projected To 1980" published in Dec. 15, 1959 issue.)

Engineering consultants employed by the Bureau to review its analysis pointed out numerous discrepancies, even though only allotted ten days to make their study—hardly adequate time for so complex a problem.

The Bureau's proposed system has been given thorough study by the utilities' engineers, using the most modern electronic computers. They have found that the system will not operate satisfactorily and is not an adequate yardstick with which to measure any type of electric operation.

Further, they have met with Bureau representatives and pointed out the many inconsistencies in their report. And yet they have been told by these representatives that they would not consider changing their analysis.

The Bureau has proposed a 345-kv single-circuit transmission system for this project, whereas the utilities offer a combination plan which is basically

a multi-circuit 230-kv system. The latter provides for both utility and Federal transmission lines to fully utilize the present and future facilities of the area without duplication.

There is no sound reason why duplicating lines of the Bureau should be built to provide the same service the utilities have offered to provide at reasonable cost. Moreover, preference customers would pay the same 6-mill rate for electricity under either the combination plan or the all-Federal plan. In fact, the investor-owned power companies contend that the 6-mill rate under the system they propose will not only provide the same "irrigation assistance" as the all-Federal system but do it at a faster rate. By irrigation assistance is meant that portion of the project cost to be paid by power revenues beyond the ability of water users to pay.

Our Congress is on record many times as opposing duplication by the Federal Government of transmission lines of the investor-owned utilities. But the Congress appears to be no match for public power proponents determined to create a giant Federal transmission grid to interconnect Federal and other public power projects across the nation.

Apparently only an aroused public can force the Bureau to reconsider its stand. Certainly engineering economics must be allowed to rule in a case such as this. And Federal funds must not be allowed to be dissipated unnecessarily when private funds are willing and able to do a better job.

A handwritten signature of S. D. Garrett.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER

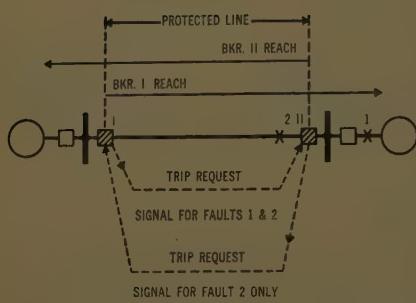


Diagram shows fault-detection zones of an overreaching transfer-trip, line protection system.



Two 750-KVA, 277/480-volt packaged substations supply power to distribution in new office building.

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●○ | ENGINEERING-OPERATIONS

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K-DAR RELAYING MASTERMINDS FAULT CLEARANCE	

Overreaching transfer-trip systems take advantage of capabilities of microwave and audio-tone pilot-wire channels to effect high-speed, simultaneous clearing of all line faults.

By J. L. Blackburn, Section Manager, and G. D. Rockefeller, Senior Engineer, Relay Dept., Meter Division, Westinghouse Electric Corporation.

APPLICATION OF ALL-ALUMINUM CONDUCTORS TO TRANSMISSION LINES

Experience indicates satisfactory performance and economies for large sizes in the light loading district; sagging can be a problem.

By Clinton E. Calvert, Project Engineer, Gulf States Utilities Company.

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PRIVATELY-OWNED DISTRIBUTION SYSTEM CUTS SERVICE COSTS FOR OFFICE BUILDING 66

Buying primary power at 13.2 kv, operating and maintaining distribution system provides flexibility and economies.

By Daniel B. Stevenson, Consulting Engineer, Des Moines, Iowa.

INDUSTRY IN CONFERENCE 70

Reports of the Pacific Coast Electric Association's Administrative Services Conference and the Business Developments Section Annual Conference.

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OUR COVER

This illustrates some of the "Safety Measures" taken by an Appalachian Power Company "Safety-Conscious" crew while working on a distribution pole in Charleston, W. Va.



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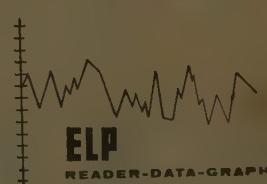
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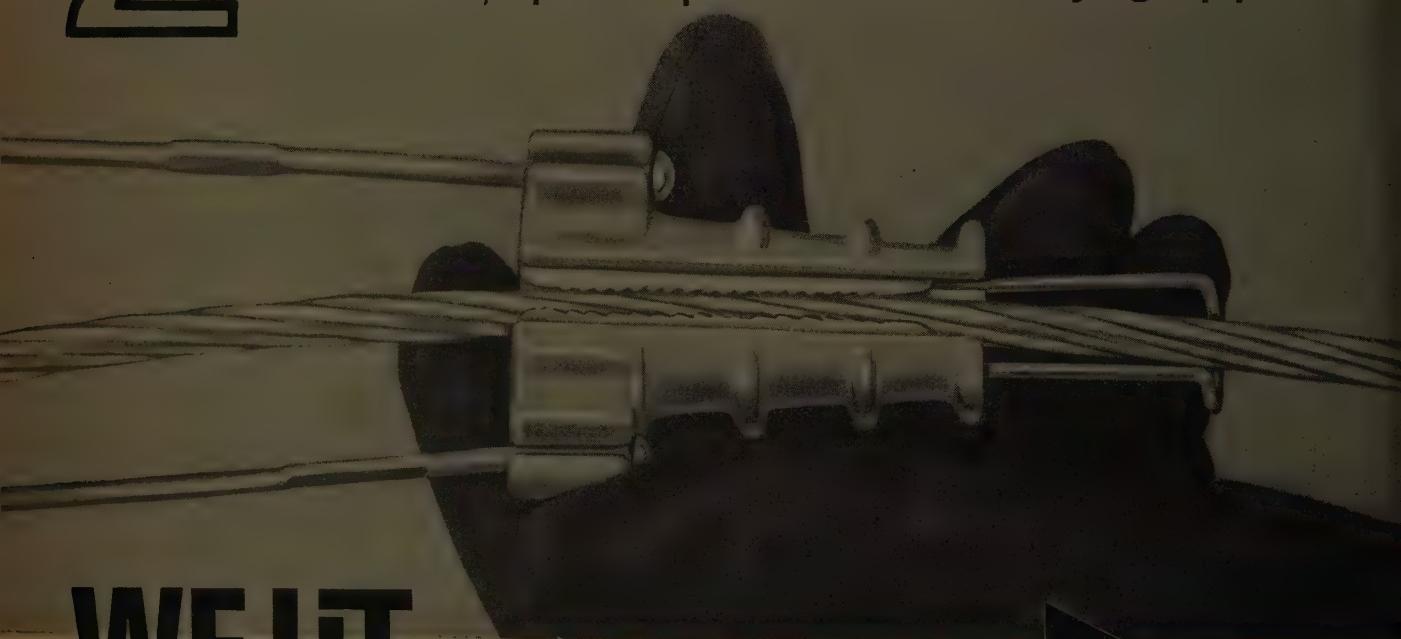
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1 to deadend services, just...
snap the cable into **WEJIT** jaws

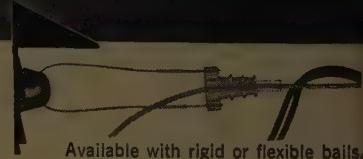


2 a short, quick pull...it's firmly gripped...



WEJIT

A **NEW DEADEND...**



Available with rigid or flexible bail.

FOR USE AT HOUSE OR POLE ■ Eliminates threading cable...eliminates accidental disassembly. ■ Automatic wedge action...the greater the load, the tighter the grip. ■ Easy to attach to wire-holder or other hardware...easy to re-sag service drop. ■ Resists corrosion, freezing, vibration...fully tested for all service conditions. See WEJIT in action—ask to see the Burndy representative or write

BURNDY

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LIGHT

AND

POWER

LINES



Anti-trust Actions Further Confound An Already Baffling Situation—The aftermath of the anti-trust violations by many of our industry's equipment suppliers is developing into a mighty big headache for all concerned.

Many factors contribute to this colossal, composite headache.

First of all, is it necessary that those who contemplate damage suits deal with individual purchase transactions or would it better serve the purpose to deal to an extent, at least, in totals? At least one prominent purchasing agent is convinced that the latter course would result in greater emphasis on negotiation rather than on triple damage claims.

An investigation of a single utility's activities in his area involves many different items of equipment in many transactions over several years. Moreover, many utilities specify minor variations in basic equipment so that it is best adapted to the individual utility's particular needs. These differences must be evaluated so that all prices can be put on a comparable basis. This kind of variation is to be found in a great many lines of the equipment involved.

It can be accepted as a foregone conclusion that the expense of assembling such detailed information, and determining possible effect upon costs would be substantial for any utility. When this is multiplied by the hundreds of utilities involved, then the out-of-pocket costs become somewhat staggering.

On top of these considerations is the sobering thought that there is little if any likelihood that damages collected would result in a difference in rates or dividends. This point was emphasized by D. K. Kallane, general counsel for the Long Island Lighting Company, in his remarks at the company's recent annual meeting. In his conclusion he said "We have purchased a total of about \$30-million of equipment involved in these cases. Even if we received back the entire purchase amount of \$30-million dollars, and if all of the proceeds were used to reduce the rate base, the effect on the rates would be less than 1½%. So,

while the amounts of money involved are large in an absolute sense, and entirely justify the time, effort and money we are putting in on these matters, in relation to the whole picture, our customers and our shareholders should not get the impression that there will result a difference in rates or dividends."

Also staggering to contemplate is the number of legal man-hours involved in this over-all situation. This caused one utility purchasing agent to remark rather sadly "And we have a rather proud record of recognizing legal conditions but minimizing legal participation and legal expense in our actual purchase transactions, with resulting financial benefit to our companies, which can be estimated if not actually computed."

Still another important consideration involved in this whole mess is the relationships between top managements of the utilities and the equipment manufacturers involved in the anti-trust cases.

A case in point is that of the Salt River Project in Phoenix, Arizona. While seeking to recover a total of over \$26-million in three suits filed in federal district court, Project President V. I. Corbell points out that "relationships between SRP and top management of companies involved continues on a friendly basis and that every effort is being made to arrive at a logical and sensible negotiated settlement."

Nevertheless, this aspect of the problem so disturbs one utility purchasing agent that he questions "Aren't we giving away a priceless asset of our industry in sacrificing or deteriorating the fine spirit of profitable partnership with our suppliers?"

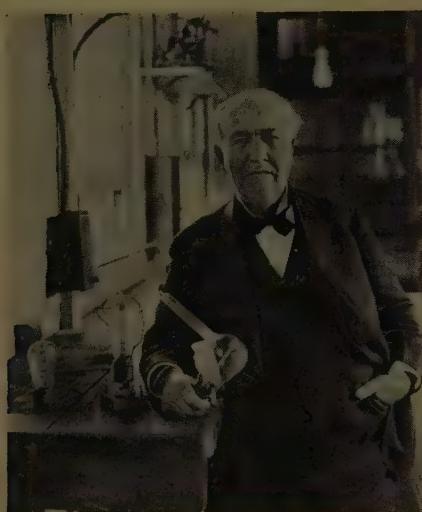
All-in-all, it is indeed a costly and devastating experience for all segments of the industry and great care is called for in minimizing its hurtful effects.

A handwritten signature in black ink, appearing to read "J. D. Larran".

Publisher and Editor

ET&P

ELECTRIC LIGHT AND POWER



Thomas A. Edison with his "Edison Effect" lamp on which the modern art of electronics is based. Edison was installed in the Hall of Fame at New York University, on June 4, 1961—see p. 52.



Artist's conception of investor-owned electric utilities exhibit that is planned for the 1964-5 New York World's Fair. Tower of light will have 24 "light cannons" each of one-billion cp based in an 80-ft tower. Model unveiled at EEI convention.

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EEI CONVENTION REPORT

AIMING FOR THE FUTURE

Load growth will continue at historic rate if we apply new technologies, pool resources, develop new leadership.

THE POLITICAL AND ECONOMIC CLIMATE AHEAD

Soul searching and self-education are musts before trying to solve problems of government.

THE EEI'S EXPANDED RESEARCH PROGRAM

Traditional pattern of leaving apparatus research to the manufacturers remains unchanged, EEI will concentrate on broad-interest projects.

ELECTRIC POWER'S FUTURE BEGINS AT 80

History of the electric power industry will not accomplish growth—challenges must be met by strengthened faith in the future.

FUTURE POWER PROGRESS REPORT

Two unconventional methods of generating electric power have some promise at this time—MHD and Thermonuclear Fusion.

RESEARCH—AND FUTURE POWER TRANSMISSION

Supporting research projects—such as lightning—help accelerate transmission developments.

DISTRIBUTION—AREA OF OPPORTUNITY

Digital computers offer major breakthroughs in distribution design and operation.

WILL RUSSIA CATCH UP?

The gap between electric energy use in America and Russia is expected to widen—but this is no cause for complacency.

THE ALL-ELECTRIC FUTURE

Being first with the best will enable the electrical industry to capitalize on the tremendous potential of the all-electric future.

July 1, 1961

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WE BETTER ELECTRICALLY

"Flameless" is the key word in the three-year-old Live Better Electrically Program.

ECONOMIC FUTURES

Expect atomic power to be competitive with fossil fuels in high-cost areas of the U. S. by 1968 and in medium-cost areas in the 1970's.

MORROW'S MANAGERS

Larger companies, competition, and complexity will make the jobs of tomorrow's managers vastly more difficult.

WORLD'S FAIR PROGRESS REPORT

Electric utility industry's exhibit has one basic purpose—convincing visitors that this industry is vitally concerned with their well-being.

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OUR COVER

Artist's abstract of the nation's gigantic transmission network focuses attention on the future developments to be expected in transmission, discussed in the special EEI Convention Report Section of this issue.



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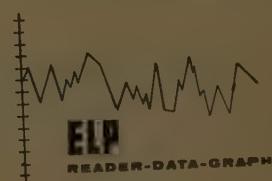
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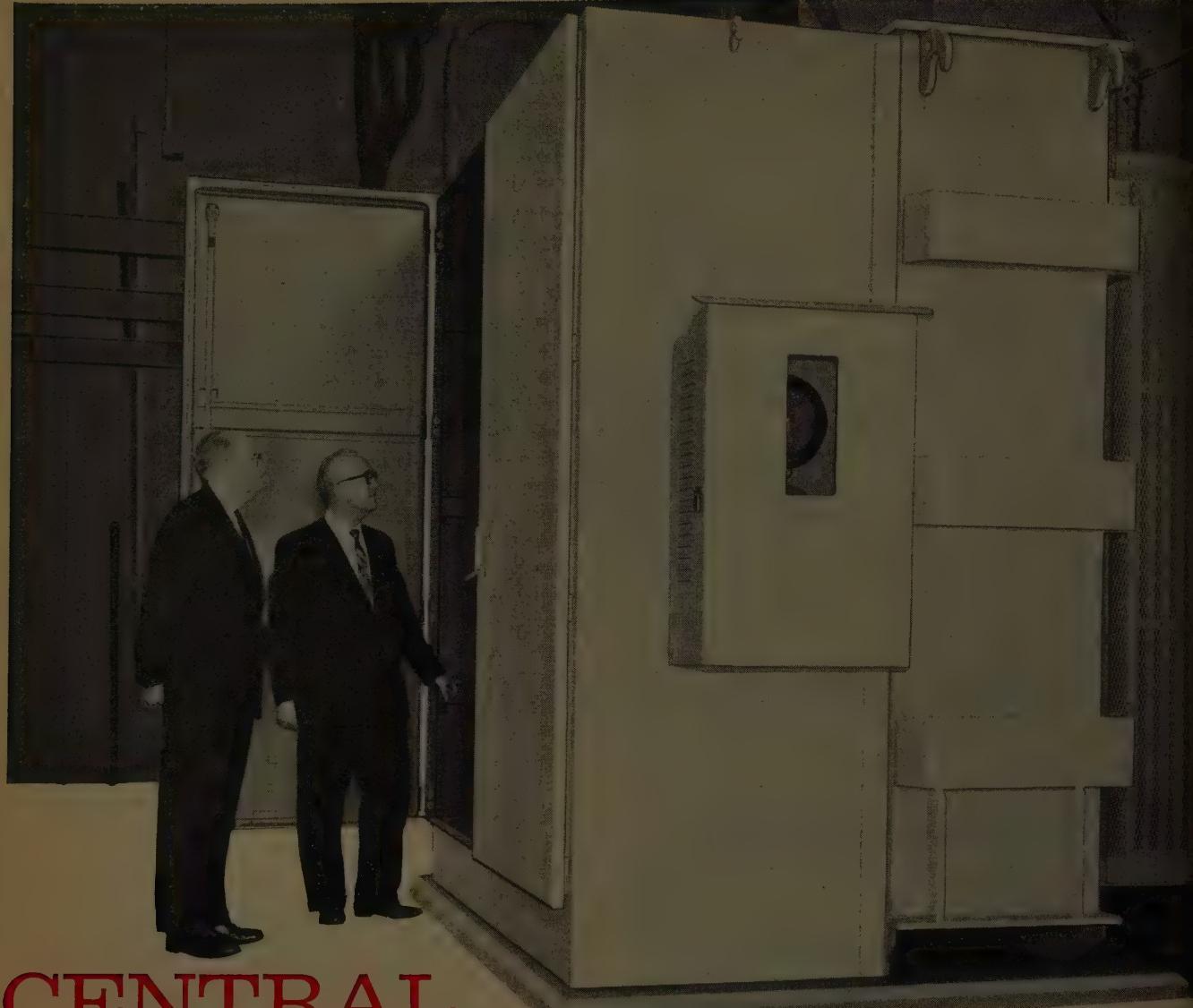


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CENTRAL 1500 KVA Pad Mounted Transformer

NOW IN SERVICE ON
DALLAS POWER &
LIGHT COMPANY'S
SYSTEM

O. B. Ashmore, Senior Engineer, and Lowell Baker, Department Head, Operating Division, for Dallas Power & Light Company, inspect newly installed Pad Mounted Central power transformer.

This Pad Mounted power transformer, with its neat appearance, compact size, and tamper proof features, solved a space problem for Dallas Power & Light Company. The Central unit shown above is a 1500 kva, 3-phase power transformer rated 13200 delta primary to 240 delta secondary. It is complete with a free standing outdoor enclosure, with two hinged doors enclosing bushings, lightning arresters, high voltage fuses, pot-heads, valves and current transformers.

CENTRAL



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PINE BLUFF, ARKANSAS

Plants at Pine Bluff, Arkansas, and Arcadia, Florida



LIGHT

AND

POWER

LINES



only The Barest Beginnings?—“A hodgepodge of distribution systems such as exist in the U. S. would be unthinkable to the European. For the most part, nation's 3000 separate electric systems go merrily their way, each operating in its own interest and only loosely interconnected, if at all, with other systems.”

When one views our nation's far-flung network of transmission interconnections as shown on the accompanying map (and many lines have been added in the interim), doesn't it seem incredible that any responsible observer could put his name to such statements as those quoted? And that they were published in a feature article in the May, 1961 issue of *Illinois Rural Electric News* under the by-line of J. C. Lewis, NRECA Washington Correspondent.

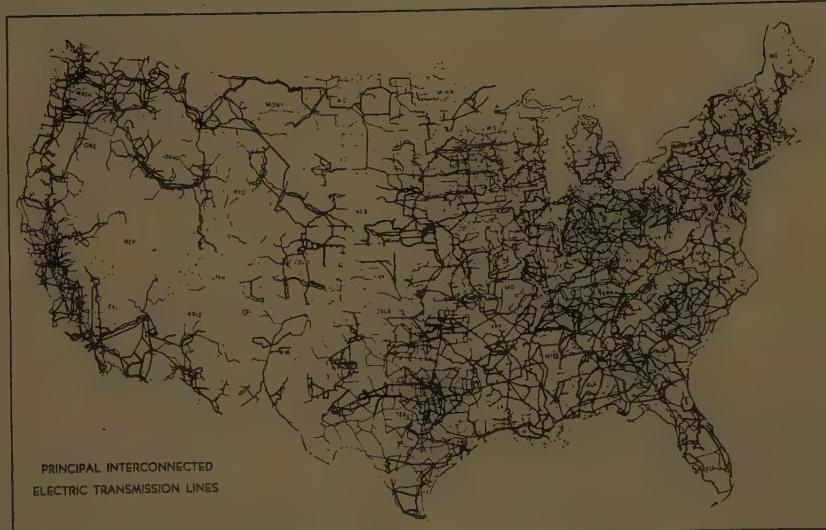
In a free-swinging pitch for Giant Power,” he says it “is a scheme that has been given an idea which envisions all the power pools in the nation being connected together coast-to-coast through a high-voltage grid system. It would simply mean that power, wherever it was produced, would be available for the entire nation to be used when and where it was needed.

“Despite the obvious simplicity, the nation has only the barest beginnings of such a plan. Actually this country's present system of interconnections of electric power systems can be described as nothing more than a cumbersome hodgepodge.”

The real goal of the most active advocates of Giant Power, or the Giant Grid, is to gain federal domination over power supply, looking to eventual socialized electric service in this country. Toward this end the “big lie” technique is being employed overtime by the would-be socializers, as evidenced by the grossly distorted power picture being propagandized by the clique of government power proponents (many of whom are riding an inside track in the Kennedy Administration) and as typified by the Lewis article.

To bare the insidious dishonesty, as well as the danger, of such irresponsible propaganda is a duty that must be accepted and worked at untiringly, not only by those directly responsible for defending and preserving the investor-owned, free-enterprise concept, but by all who recognize that we of this nation cannot long continue to hold ourselves out to the

world as the democratic bulwark against the various forms of Marxism, while we lazily drift on a tide running strong toward Socialism.

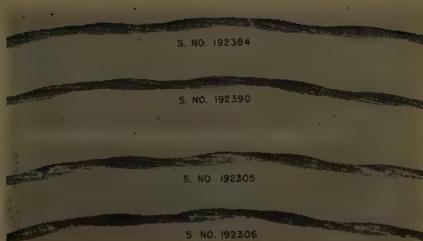


A handwritten signature of J. C. Garrett.

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



Photograph showing interior surfaces of No. 2 ACSR 6/1, with the three outer aluminum strands removed, after 43 months' exposure. S. No. 192384 is aluminized wire (no compound A used), S. No. 192390 is aluminized wire using Compound A, S. No. 192305 is hot-dipped galvanized wire (no Compound A used), and S. No. 192306 is hot-dipped galvanized wire using Compound A. See story p. 58.



This is a typical controlled capacitor installation, rated 3 cmva and 23 kv, located on The Eastern Shore Public Service Company of Maryland System.

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ALUMINIZED STEEL CORE WIRE IMPROVES ACSR PERFORMANCE

Efforts between Alcoa and certain wire manufacturers have resulted in a new aluminum-coated (aluminized) steel wire for ACSR.

By J. E. HALL and E. T. ENGLEHART, Chemical Metallurgy Division, Alcoa Research Laboratories, New Kensington, Pa.

CAPACITORS SWITCHED VIA CODED MOBILE RADIO CONTROL

Surplus mobile radio receivers are used by system operator to dial capacitor operations.

By J. E. HOBBS, Supervisor of System Operations and C. L. GILLIS, Communications Engineer, The Eastern Shore Public Service Company of Maryland.

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ECTS OF 65 DEGREES RISE TRANSFORMERS IN DISTRIBUTION DESIGN 65

Substantial reduction in operating costs is possible with 65C rated-load rise performance changes.

By A. M. LOCKIE, Advisory Engineer, Distribution and Instrument Transformer Department, Westinghouse Electric Corp., Sharon, Pa.

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Reports on EEI Transmission and Distribution Committee Meeting, PCEA Annual Convention and Line Material Industries Distribution Systems Seminar.

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OUR COVER

This "little" gantry crane is installed at the South Bay Power Plant of San Diego Gas & Electric Company. The crane has a 40-ft clearance and rides on tracks which have a span of 106 ft. The electrical system for the crane is installed on the upper part of the bridge. Lifting capacity is 50 tons.

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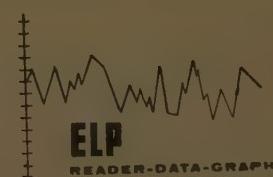
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answers basic plant expansion questions...

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SPECIFICATIONS

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Timely?

Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds all types of power plants—steam-electric, gas turbine, combined cycle, nuclear, and hydro-electric. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.



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LINES

Don't Miss This Year's Report!— Considerable data previously gathered, and that is of particular importance to electric utilities at this time, will be found in this year's report on the industry's performance in the major-appliance field. These new findings are incorporated in EL&P's annual report published in this issue.

Included this year is a report of the commercial electric cooking activities of the respondent utilities. Total commercial customers being served are reported; how many are food serving customers; and how many food serving customers use major electric cooking equipment. Also reported is the number of respondent utilities that have special rates for commercial cooking.

Appliance servicing is also analyzed: how many of these utilities service electric appliance; have a dealer service training program; have a vocational appliance service training program in their junior colleges and trade schools.

Service entrance policies are also explored this year: how many respondent utilities supply, at no cost, facilities extending through the meter; through the service entrance main breaker; through the circuit breaker for individual appliance circuits; to the customer's major appliance, including the cable. All-in-all, this year's report brings to the industry a great deal of valuable information. Our thanks are due the utility commercial executives who have made it possible for EL&P to render this special service to the industry.

"Bare Hands Technique" Questionable For Distribution Circuits—An urgent warning has been sounded by Clyde Crockett, transportation superintendent, Louisiana Power & Light Company, regarding the hazards of applying to distribution circuits (34.5 kv and below) the technique recently developed for working bare-handed on energized high-voltage transmission conductors from insulated aerial basket devices.

This timely warning is of sufficiently broad interest to utility operating management to warrant special emphasis.

Mr. Crockett makes the important point that working conditions on transmission lines are drastically different from those on distribution circuits. For maintenance and repair work on transmission lines which cannot be taken out of service, the "Bare Hands Technique" has been demonstrated to be an acceptable method of doing this work,* provided that the boom of the aerial basket device has passed an a-c hi-pot test of sufficient magnitude to insure its safety. However, as Mr. Crockett warns, the use of such a technique on distribution voltages, where another phase or ground wire is within reaching distance of the lineman when he is working one phase hot, presents an entirely different problem.

A well-insulated basket is of no importance when working transmission voltages, because of the much greater physical separation of the conductors. On distribution work, however, the man's very life often depends on the insulation *through* the side wall or bottom of the basket in which he is standing.

These hazards in doing distribution hot-line work are recognized by Mr. Crockett's company. It is a company requirement that all phase wires and grounded neutral wires within reach of the working position (other than the wire being worked on) be covered with rubber line hoses, blankets, hoods, etc.

Recently, this company has been successful in promoting the development of dense polyethylene basket liners and now makes routine tests of these liners at 50 kv for one minute every two weeks.

Mr. Crockett expresses the sincere hope that electric utilities now using or contemplating using aerial basket devices for hot-line work will give the hazard problem highlighted here their most careful consideration when establishing working rules and safety regulations.



S. D. Garrett
Publisher and Editor

*See EL&P article titled "Live-Line Maintenance With Bare Hands Cuts Man-Hours And Hazard," published in the Dec. 15, 1960, issue.

EL&P

ELECTRIC LIGHT AND POWER



This is the control panel for a push-button asphalt plant in Roanoke, Va. For details see p. 35.



Checking wiring installations for customers' new homes is part of the job for Home Service Representatives at Carolina Power & Light Co.

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EL&P 32ND ANNUAL MAJOR-APPLIANCE SURVEY

Survey of 1960 industry performance reveals that electric appliance sales reflect setback suffered by the national economy during the year.

ELECTRIC HEAT CUTS COSTS AT PUSH-BUTTON ASPHALT PLANT

One man operates an entire asphalt plant—primarily by pushing buttons.

By H. M. SMYTHERS, Commercial Sales Engineer, Appalachian Power Co.

WHAT THE COMPANY EXPECTS FROM THE POWER SALES ENGINEER

The power sales engineer needs to do a better job of relating product features to customer benefits.

By S. L. CHAPIN, Manager Industrial and Commercial Sales, Public Service Electric & Gas Co.

HOME SERVICE TAKES ON NEW ROLES

Today's Home Service Representatives have played their role of cook to the hilt; now they are also teachers and writers.

By MARGUERITE G. SURLES, Home Service Director, Carolina Power & Light Co.

ARE FOOT-CANDLE LEVELS TOO HIGH?

Experience with superior lighting teaches management that it is basic to improvement of efficiency.

By E. A. LINDSAY, Supervisor of Industrial Lighting Applications, Large Lamp Dept., General Electric Co.

PEOPLE-TO-PEOPLE-APPROACH SELLS MEDALLION HOMES

Medallion training program for real estate salesmen and developers has received enthusiastic acceptance.

By R. N. ROBERTSON, Director, Residential Development, Florida Power Corp.

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ermal-Storage Space Heating ains in Scotland..... 44

Use of off-peak electric energy to store heat for space heating is becoming increasingly popular in the South of Scotland.

JOHN W. MOULE, Chief Commercial Officer,
South of Scotland Electricity Board, Glasgow

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OUR COVER

This residential salesman is discussing the advantages of electric home heating with a customer at the Canton Office of the Ohio Power Company.



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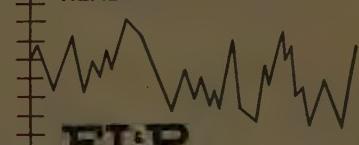


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READER-DATA-GRAPH



ELP

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here it is! A REAL

ONE-HAND TOOL

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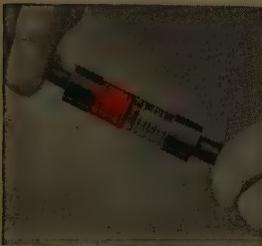
one crimp per end!



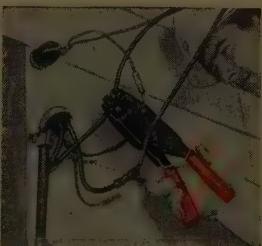
You'll like this ONE-HAND TOOL . . . from start to finish, you can really work it with only ONE HAND. You can close it with less than a 50 lbs. squeeze; it weighs only 2½ lbs. and is only 12" long. You couldn't ask for an easier service tool . . . it's the only *real* ONE-HAND TOOL.

Position the OH25 once . . . and only once . . . on each side of the INSULINK or uninsulated LINKIT. It has a new die that crimps the entire contact area at one time. You don't have to reposition, you can't overlap crimps, and you never make less than the proper number of crimps.

And, it takes only ONE CRIMP PER END . . . a series of easy, ratchet controlled strokes to make a perfect crimp every time. The new dies cause the conductor strands to rub together, removing the oxide film for more stable, low resistance connections.



Insert stripped wire ends into INSULINK; caps grip and hold conductors.



Get up close to your work. Position ONE-HAND TOOL on INSULINK only once per crimp.



A series of easy strokes complete the crimp. Dies produce oxide removing wiping action between conductor strands.

ANOTHER MAJOR DEVELOPMENT IN THE

BURNDY

LIGHT

AND

POWER

LINES



Ramatic New Emphasis On Nighttime Holiday Fatalities—An entirely new technique was utilized by the National Street and Highway Safety Lighting Bureau to dramatize the grim toll of human lives which resulted from nighttime traffic accidents during recent five-night July 4th holiday.

Appropriately named "Operation Nightwatch," this project totaled night holiday fatalities in seven states for which probable fatalities had previously been computed. It employed the special services division of a national news-reporting agency to count the death toll from sunset to sunrise in Connecticut, North Carolina, Ohio, Pennsylvania, Wisconsin, New York and Illinois. News releases were sent out by the Bureau to newspapers in these seven states as this experimental tally progressed.

With two exceptions, there was amazing correlation between the night-fatality predictions and the actual count, as these figures show:

Connecticut	— 2 predicted;	1 actual
Illinois	— 17 predicted;	16 actual
New York	— 18 predicted;	13 actual
North Carolina	— 9 predicted;	8 actual
Ohio	— 17 predicted;	16 actual
Pennsylvania	— 13 predicted;	8 actual
Wisconsin	— 8 predicted;	4 actual

The fact that Pennsylvania and Wisconsin did considerably better than the Bureau feared is believed to be due to the considerable amount of new lighting that has been installed this last year on expressways traversing major cities in those states.

As was anticipated, motorists using the well-lighted Connecticut highways were able to see double in time to avoid disaster, giving them an extra margin of safety.

Edmond C. Powers, Educational Director of the Bureau, estimated that if roadway lighting in the other states considered in the special "Operation Nightwatch" study had been equal to that of Connecticut, 47 of the 66 victims would have been saved.

Connecticut has kept records of all night-accident locations since 1936 and established the fact that by installing proper fixed-source lighting they cut their night-accident tolls 60 percent in dangerous urban locations and 85 percent in rural sections.

Traffic deaths in the seven-state night-accident study present the following expense bill, according to Mr. Powers: Ohio and Illinois—\$2,640,000; New York—\$2,145,000; Pennsylvania and North Carolina—\$1,320,000; Wisconsin—\$660,000; and Connecticut—\$165,000. These figures are based on the loss of family income for life, insurance costs, property damages, and medical and hospital expenses.

Results of this unique experiment provide a sound basis on which to build for future night-accident analyses. Data thus accumulated also provides current factual material for the women in the nation who, under the leadership of the Safety Division of the General Federation of Women's Clubs, are committed to rid our streets and highways of accidents that result from darkness. Of course it is also for the benefit of utility executives and safety officials of Municipal, County and Federal Government.

These new findings present a compelling challenge to all utility management to redouble their promotional efforts in the whole field of street and highway lighting.

A handwritten signature in cursive script, appearing to read "J. D. Garrett".

Publisher and Editor

EL&P

ELECTRIC LIGHT AND POWER



These men are "reweaving" loose aluminum strands in preparation for applying a repair sleeve on 345-kv live line—see p. 38.



This is one of the decouplers used for isolating the 750-kv lines on Apple Grove Project. For details see p. 44.

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CONDUCTOR REPAIRED ON 345-KV LIVE LINE WITH BARE HANDS

Repair sleeve was installed by two men in one hour—would have required 25 man-hours prior to development of the bare-hand technique.

AUTOMATIC PURCHASING REQUISITIONS

Mechanical review of stock balances is made by simple-automatic system before requisitioning 80-percent of general materials and supplies.

By C. J. MAGNESEN, Purchasing Dept., Commonwealth Edison Co.

APPLE GROVE PROJECT

Prime objective of the 750-kv transmission research project is to obtain data on corona loss and radio influence performance of conductors.

HOW TO DRASTICALLY REDUCE LINE-DEPARTMENT COSTS!

One utility is now realizing an annual savings of \$175,000 by optimizing its line-crew organization.

By STANLEY W. ANDERSON, PhD., Operations Research Specialists, Middle West Service Co.

COPPER-SILVER ALLOY SAVES CON EDISON THOUSANDS

A special copper-silver alloy used in commutators, rotors and squirrel cage windings has provided Con Edison with substantial savings.

By HOWARD BLANK, Assistant Manager of Technical Services, Amco Division, American Metal Climax, Inc.

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CONCRETE PLACEMENT GIGANTIC CHALLENGE AT GLEN CANYON..... 51

Reusable lifts and bulk supply and handling techniques introduce worthwhile economies.

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OUR COVER

An engineer of the Quebec Hydro-Electric Commission scrutinizes the inside wall of one of eight 10-ft diameter steel penstocks at the Bersimis River power project in Northeastern Quebec, looking for damage in the enamel coating. Coating showed no apparent wear after 3½ years. Photo courtesy of Koppers Co., Inc.



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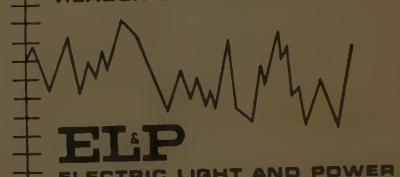


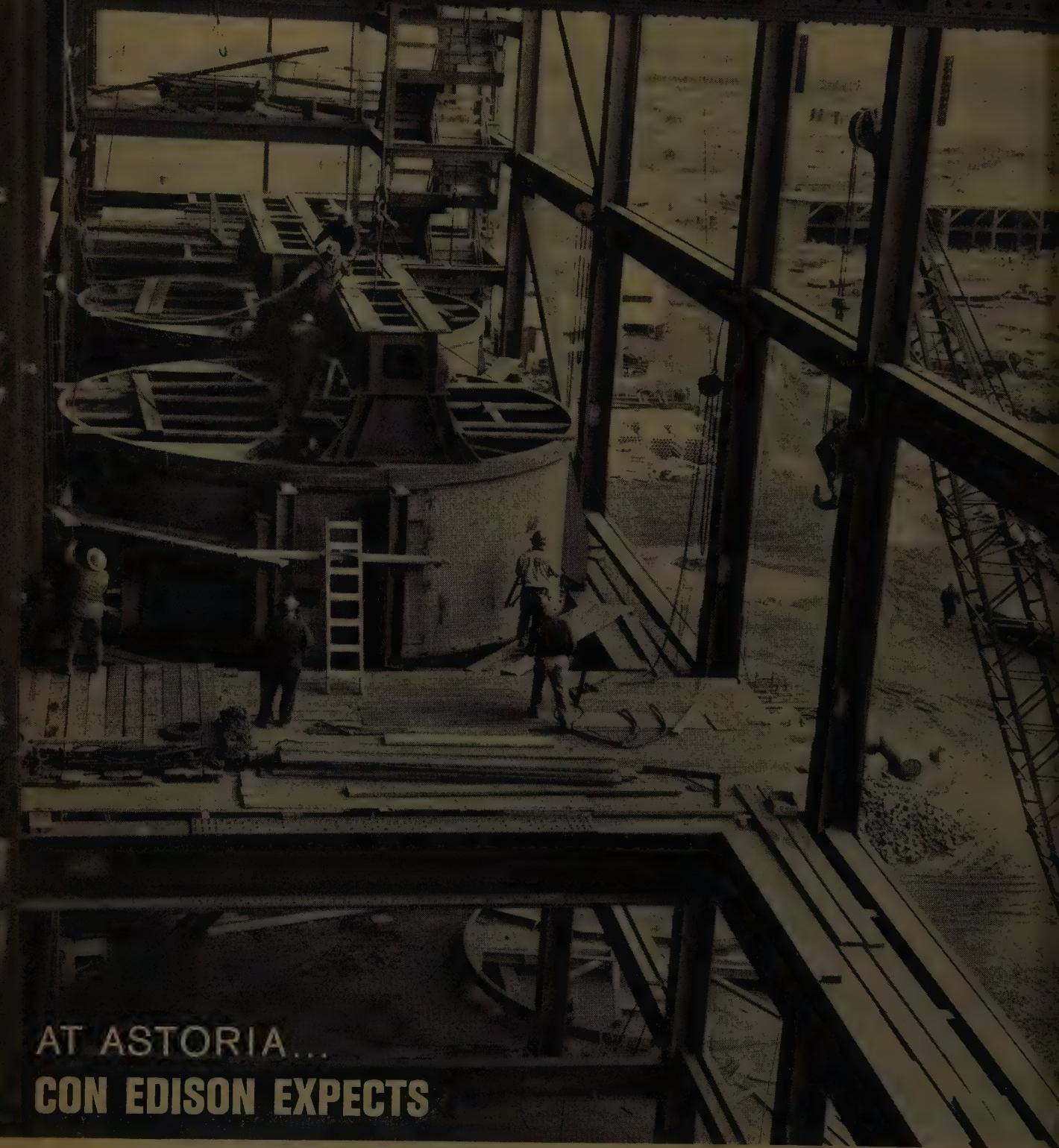
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AT ASTORIA... CON EDISON EXPECTS

FUEL SAVINGS OF 8% FROM FOUR NEW LJUNGSTROMS

Four new Ljungstrom Air Preheaters are being installed by Consolidated Edison Company of New York, Inc., on their Astoria Stations' #50 boiler unit. With a total heating surface of about 547,000 sq. ft., these four units are designed to reduce the stack temperature 345° F. By transferring this heat to the incoming combustion air, a

fuel savings of about 8% is realized. Addition of these units makes a total of 16 Ljungstroms installed at Astoria ... 77 either installed or on order in the entire Con Edison system.

Our engineers will be glad to recommend ways to improve your operating results on new or existing fuel fired units. For information, please write to:

**THE AIR PREHEATER
CORPORATION**

60 East 42nd Street, New York 17, N.Y.

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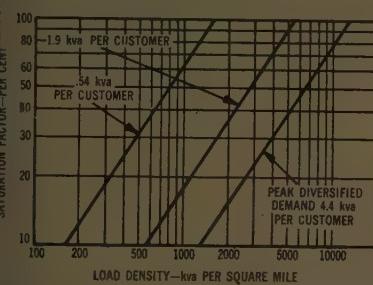
THE MAGAZINE OF ELECTRIC-UTILITY TECHNOLOGY

September 1, 1961

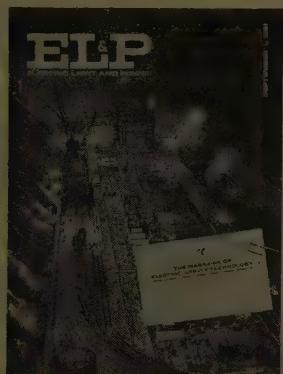
Volume 39, Number 17



Area lights have been sold by Carolina Power Light employees to literally every imaginable type of commercial customer—including this cemetery at Whiteville, N. C.



Relationship between saturation factor, diversified demand per customer and load density as found in intensive distribution study—see p. 20.



OUR COVER

This photo depicts the immense construction job involved in building the largest hydroelectric project in the western world—the Niagara Power Project of the New York State Power Authority. Each of the 13 generators for the project is rated at 150,000 kilowatts. Photo courtesy Westinghouse, the manufacturer of the generators.

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EMPLOYEES SELL OVER 200 AREA LIGHTS WEEKLY	18
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Non-sales employees are utilized to promote sales of 7,000-lumen mercury lighting units.

By WILLIAM P. MCPHERSON, Commercial Sales Manager, Carolina Power & Light Co.

COMPUTER ANALYSIS ILLUMINATES THE FUTURE OF DISTRIBUTION VOLTAGES	20
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Economic comparisons of 13-, 23- and 34.5-kv primary feeder voltages were made employing advanced digital-computer techniques.

By DAVID N. REPS, Distribution Engineer, Westinghouse Electric Corp.

WHAT THE CUSTOMER EXPECTS FROM THE POWER SALES ENGINEER	26
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Customer's advice: Help the plant engineer and you will eventually sell more power.

By GEORGE J. MANN, M.S., Director of Engineering and Maintenance, White Laboratories, Inc., Kenilworth, N. J.

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Ten percent of Wisconsin Power & Light Co.'s peaking capability is supplied by hydro plants.

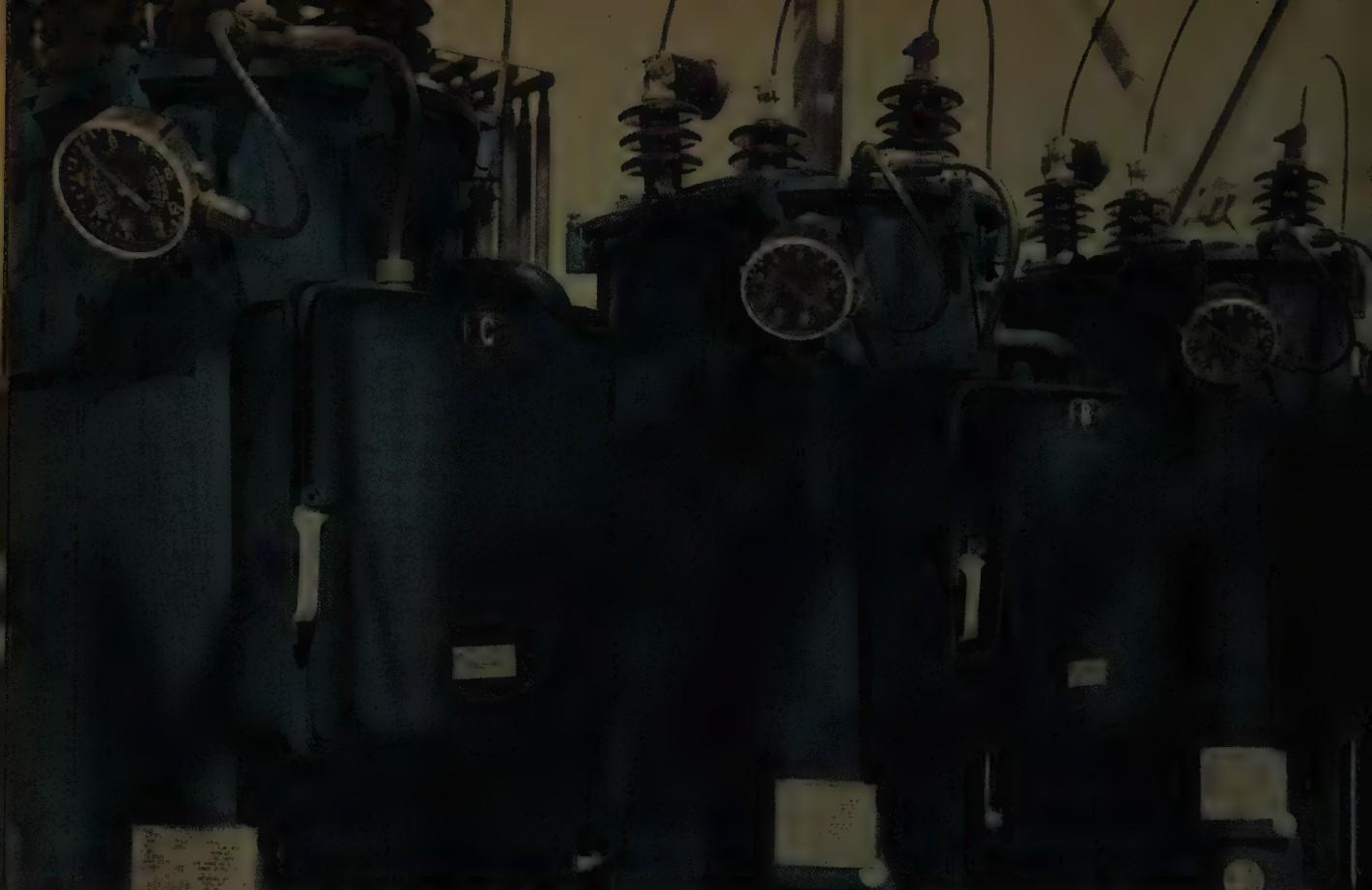
By J. D. HOWARD, Vice President, Wisconsin Power and Light Co.

CEREAL CROPS ON FLY ASH	31
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Grains, grass and other root crops are being grown on pure ash taken from boilers.

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THE NEW TYPE ES electronic sensing device designed by L-M for its type RSD regulators is readily accessible in the externally mounted control cabinet.

Here is a substation installation by a midwest utility.

New L-M Electronic Regulator Control Cuts Maintenance, Ups Speed, Accuracy

L-M announces revolutionary new type ES Electronic Sensing Control for L-M Voltage Regulators. Eliminates contacts and their maintenance; eliminates moving voltmeter parts; provides faster, sharper response, constant band width.

Recently L-M engineers have replaced the accurate contact-making voltmeter in L-M regulators with an even more precise and dependable electronic sensing control. This control has been thoroughly tested. Completely static parts provide utmost reliability, and extremely sharp and fast response to voltage variations.

Now there are no moving parts to wear out or malfunction. No contacts in the sensing mechanism to erode and require replacement. Band width easily set by adjusting knob on face of meter. Band width may be adjusted from \pm less than one volt to \pm 6 volts. Two neon lamps indicate when voltage is outside band width. Upper lamp lights for high voltage, lower for low voltage. Once set, band width will not drift from desired setting.

Get Details From The L-M Field Engineer

L-M offers a really outstanding regulator. And L-M's new electronic control is outstanding, too. Investigate, test, and standardize on L-M Voltage Regulators. To convince yourself, ask the L-M Field Engineer for bulletins and application data. Or write Line Material Industries, Milwaukee 1, Wisconsin.



A. Electronic Sensing Device
B. Neon Lamps
C. Band width adjusting knob

L-M'S EXCLUSIVE NEW electronic sensing control for L-M Voltage Regulators. Transistors assure fast and extremely accurate response to voltage changes. Maintenance is reduced because there are no contacts to erode and replace.



LINE MATERIAL[®] Industries
McGRAW-EDISON COMPANY

Regulators



NEW PRODUCT BRIEFS

High-speed solutions to load flow problems are available through Data, Inc., by means of electronic computing methods. Solutions are provided for power system load flow problems involving up to 300 busses, 600 branches and 100 variable bus types. Understandable, easily-worked data forms and complete instructions are provided.

For more data, mark #10 on reply card

A room temperature curing, semi-flexible epoxy resin system specially formulated for sealing grounded well junction boxes and explosion-proof ratings has been announced by Minnesota Mining and Manufacturing Co. Because the resin cures by self-generated action, it is well suited for field use in potting condulets and other electrical fixtures, the company says.

For more data, mark #11 on reply card

New contemporary opal luminaires, just announced by Stonco Electric Products Co., are designed for all outdoor or indoor locations requiring soft, luminous effects from a decorative severe-service fixture. The pure white opal glass spreads evenly diffused light, the company says, down and out in a wide pattern to illuminate walkways, entrances, carports, breezeways and other areas where glare-free lighting is needed.

For more data, mark #12 on reply card

Schutte and Koerting Company has just announced a new line of solid state electric Rotameter Transmitters that are available with any of five dc output signals to match the requirements of most existing electric receivers or computers. The transmitter, according to the company, is capable of measuring and transmitting flow rates up to 200 gpm in pipelines up to three inches, at pressures up to 600 psig.

For more data, mark #13 on reply card

Dynapar Corporation, electronic subsidiary of The Louis Allis Co., has recently announced the introduction of a complete line of Digital Rotopulser sensing devices for precise industrial measurement and automation control. The Rotopulser is a ruggedly constructed rotary transducer, the company says, which converts mechanical motion into digital voltage pulses.

For more data, mark #14 on reply card

The new A+540 thermistor/thermocouple system, a highly accurate, low-cost means, the company says, of combining continuous process temperature control at various locations with indication at a central point, has just been developed by Atkins Technical Inc. The A+540 system consists of three main elements: Probes, thermistor controls and potentiometric indicator.

For more data, mark #15 on reply card

An easy-to-maintain analyzer for measurement and/or control of free or total chlorine residuals in water supplies and sewage effluents has been announced by Fischer & Porter Co., manufacturers of chlorinators and process instrumentation.

For more data, mark #16 on reply card

A new miniature photoconductive cell which more closely approximates the spectral perception of the human eye than any other device heretofore available, the company says, has been announced by Clairex Corporation. This new cadmium sulphide cell is capable of measuring, according to the company, either tungsten or daylight over a wide range of color temperatures through variation in its conductance.

For more data, mark #17 on reply card

Newly-designed plastic cable-connecting sleeves and terminals for making through connections and branches of electric cables have been placed on the American market by N. V. Hollandsche Draad-en Kabelfabriek of Amsterdam, The Netherlands. These sleeves and terminals feature sheathings of plastic, natural or synthetic rubber (neoprene) or lead.

For more data, mark #18 on reply card

Now available from Power Dispatchers Equip. Co. is a new "Print-N-Press" kit for use in making name plates and labels applicable to utility company dispatching boards. The kit includes cutting board in attache case, knife, pressure sensitive materials, lettering tapes, and complete instructions.

For more data, mark #19 on reply card

September 1, 1961

ELECTRIC LIGHT & POWER

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For further information on ads and editorial in this issue write in page numbers and items:

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City _____ Zone _____ State _____

PLEASE NOTE—Title and Company connection are obligatory if response

Secure more data on new products, to obtain copies of industry literature, please circle the appropriate key numbers on the postage-free reply card and drop in the mail.

New line of plastic safety guards for guy wires, made by the Electrical Products Division of the Fanner Manufacturing Co., is described in a bulletin containing drawings illustrating typical methods of attachment. It also lists dimensions and ordering information.

For free copy, mark #20 on reply card

Sherman and Reilly's catalog supplement No. 611-A covers an entirely new method for installation of spacer type aerial cable. The key to this system is a messenger traveling block and messenger bracket which permit blocks and conductors to pass poles without assistance.

For free copy, mark #21 on reply card

New publication from General Electric is "Frequency Telemetering-Transistorized Analog System" (GEA-7163), eight pages. Schematics plus information concerning the new system's adaptability, flexibility and specifications are included.

For free copy, mark #22 on reply card

Two technical bulletins are now available from Subox, Inc.: "Capox Catalyzed Epoxy Coatings," describes catalyzed epoxy coatings as improved over the past 4 years. These have outstanding chemical resistance, can be applied over damp or moist surfaces, and are good corrosion inhibitors, the company says. "Calvanox Type II (Epoxy)," describes a zinc-rich electrically conductive coating in a catalyzed epoxy vehicle recommended for severe industrial exposures as a direct replacement for hot dip galvanize type coatings.

For free copy, mark #23 on reply card



NEW LITERATURE BRIEFS

—Remittance Required—

New 552-page book published by Reinhold Publishing Corp. is "Water Treatment For Industrial and Other Uses," by Eskel Norell. This illustrated reference work discusses the conditioning and treatment of water supplies for industrial and domestic uses. Price is \$12.00 per copy.

"Price-Level Adjustments of Financial Statements"—an evaluation and case study of two public utility firms—by Eldon S. Hendriksen, published by Washington State University Press, presents a discussion of the use of various price indexes in the adjustment of financial statements. Price is \$4.00. Also available from the same publisher is "Electric Utilities—Costs and Performance," by William Iulo—a study of inter-utility differences in the unit electric costs of privately owned electric utilities. Price is \$7.50.

"Top Management Committees, Their Functions and Authority," by M. R. Lohmann provides information on how management committees are classified, how they operate, and the specific functions and authority with which they are invested. The 64-page study is published by the American Management Association, 1515 Broadway, New York 36, N. Y. Price is \$3.00 to non-members; \$2.00 to AMA members.

"Fuel Cells: Power For The Future," said to be the first published

analysis of the commercial feasibility of fuel cells, is written by nine graduate students of Harvard Business School who spent a year interviewing leading scientists, reviewing papers and analyzing activities of companies doing fuel cell research. The 160-page book is available from Fuel Cell Research Associates, P. O. Box 157, Cambridge 38, Mass. Price is \$18.75 per copy postpaid.

Proposed amendments to the present 1959 National Electrical Code are now available in printed form for review by electrical inspectors, contractors, manufacturers, and all others in the electrical industry. Affecting many types of commercial, industrial and domestic installations, the changes submitted for inclusion in the 1962 edition of the Code have been published in a 390-page volume (NFPA No. 70 PR-1961) by the National Fire Protection Association. Copies may be obtained, at \$2.50 each, from the Association, 60 Batterymarch Street, Boston 10, Mass.

A new IPCEA-NEMA Standards Publication for thermoplastic-insulated wire and cable for the transmission and distribution of electrical energy has been completed and now is available at \$3.50 per copy from either the Insulated Power Cable Engineers Association, 283 Valley Road, Montclair, New Jersey, or the Standards Editor, National Electrical Manufacturers Association, 155 East 44th Street, New York 17, New York.

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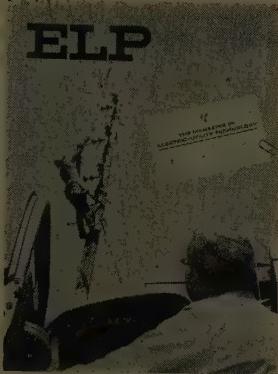
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September 15, 1961

Volume 39, Number 18

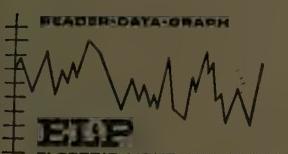


DUR COVER

Oklahoma Gas and Electric Company Foreman, J. T. Stephens, catches a lineman from the Central Rural Electric Cooperative remove jumpers from section of line purchased by OG&E from the Co-op when area was annexed to Oklahoma City.

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By E. H. PRESTON, Field Engineer, Market Development Division, Leeds & Northrup Company

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Individual efforts of industrial power representatives can be amplified by formal customer training.

By EDWARD M. KANE, Engineering Representative, Industrial Power Dept., Baltimore Gas & Electric Co.

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By ROBERT E. LARSON, Rome Cable Division, Aluminum Company of America

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In addition to producing accurate results, the Tellurometer method provides a low-cost, short-time survey.

By H. E. RAGSDALE, Supervising Engineer, Pipeline Division, Bechtel Corp.

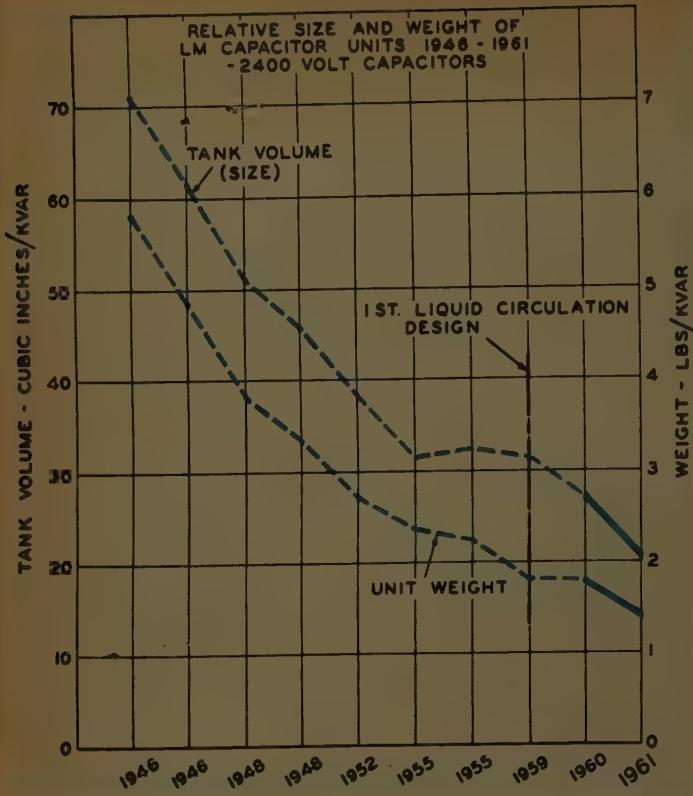
CABLE CAR IS SCHOOL BUS FOR CROSSING RIVER..... 96

Electrically-operated cable car is used to transport school children across the Yellowstone River—replaces 64-mile trip over rough roads.



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ABOVE GRAPH SHOWS THE STEADY REDUCTION in relative size and weight L-M has made in capacitors throughout the years. A result of L-M's continued research and development programs backed up by expensive test facilities. The latest product, L-M's new Form 6, 50 kvar capacitor, is 17% smaller and 23% lighter. These new capacitors require less space to store, less effort to handle in warehouse and truck. Linemen will find them easier to handle and hoist.

L-M's New Lightweight 50 Kvar Capacitor Assures Ease In Handling and Installation

Exclusive cooling methods developed by L-M permit a smaller tank, less Elemex cooling liquid for this lightweight unit.

Line Material announces the new Form 6, 50 kvar capacitor. Another outstanding product of L-M's research and development facilities! This new unit has been greatly reduced in overall size and weight, making it much easier to store, handle, and install.

L-M's exclusive cooling method makes possible this phenomenal reduction in weight and size of Form 6 capacitors. This L-M development permits the circulation of Elemex liquid between and around the packs. Heat generated within the capacitor is carried to the radiating surface of the stainless steel tank. Heat is dissipated more rapidly. The capacitor remains cooler internally even though it is smaller.

Get Complete Information

Have your L-M Field Engineer give you complete details on this new L-M lightweight Form 6, 50 kvar capacitor. Or write Line Material Industries, Milwaukee 1, Wisconsin.



LINE MATERIAL[®] Industries

McGRAW-EDISON COMPANY

ELEMEX[®] Capacitors

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THE MAGAZINE OF ELECTRIC UTILITY TECHNOLOGY

October 1, 1961

Volume 39, Number 19

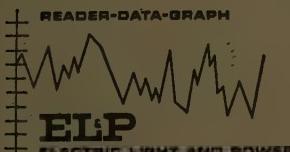


OUR COVER

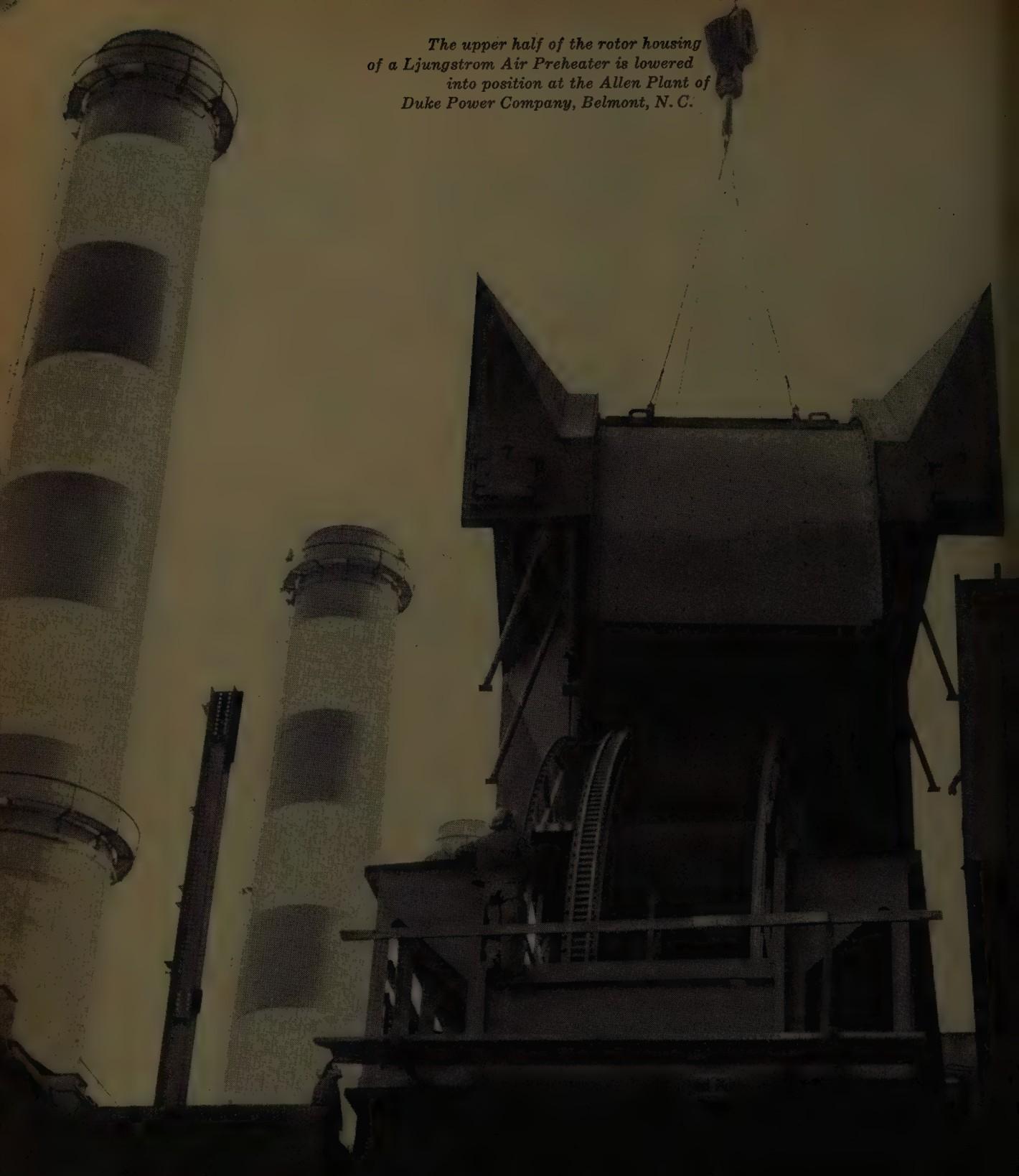
Hotfoots are a thing of the past on Portland General Electric Co.'s transformers as the utility goes to all "squirrel-and-chipmunk proof" units. Special plastic insulation keeps curious climbers out of high voltage, allowing just enough "seepage" to tickle animal's feet and encourage him to move on.

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The upper half of the rotor housing
of a Ljungstrom Air Preheater is lowered
into position at the Allen Plant of
Duke Power Company, Belmont, N.C.

IN NORTH CAROLINA...

DUKE POWER INSTALLS ITS 47th LJUNGSTROM®

Duke Power engineers expect 10% annual fuel cost savings with Ljungstrom Air Preheaters at Belmont. Two 512,000-lb Ljungstroms on the #5 boiler of the Allen Plant will preheat incoming air from 80°F to 575°F. Continuous rotary regenera-

tion will recover approximately 390°F waste heat. Every 40° thus recovered cuts fuel requirements 1%.

Our engineers will be glad to recommend how Air Preheater equipment can improve your operating results on new or existing fuel fired units.

THE AIR PREHEATER
CORPORATION

60 East 42nd Street, New York 17, N.Y.

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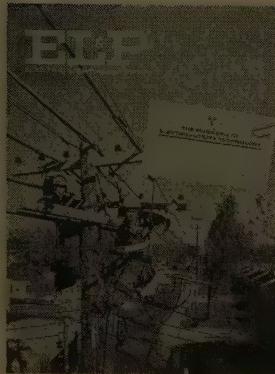
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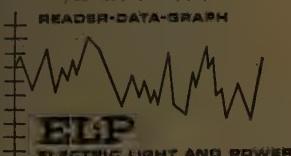


OUR COVER

A distribution pole is being replaced without interrupting service—to make room for new 4.16-kv circuit to be installed at right angle. Overall is 34.5-kv "subtransmission". Linemen are Gerald Koopmans, left, and Carl Zimmerman, right, Iowa Electric Light and Power Co.

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Hollow conductors, developed to hold corona-loss and RI to a minimum, has proven itself with five years of operation.

By ANDREW E. HILL, Transmission Engineer,
New England Electric System

UTILITIES HAVE BIG STAKE IN SALT WATER CONVERSION..... 36

Electric-utilities stand to benefit materially from developments made in conversion of brackish or sea waters.

By G. E. SONDERMAN, Vice President,
Fluor-Singmaster & Breyer, Inc.

TRANSFORMER COSMETOLOGY—(HOW TO GET GOOD TRANSFORMER COATINGS)..... 41

Beauty is more than skin deep for transformer coatings as pointed out in this discussion.

By LEROY HUTZLER, III, Supervisor—Process Engineering
Medium Transformer Dept., General Electric Co.



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CONTROLS FOR LIGHTING the athletic and parking lots at a midwest high school are contained in this Transclosure housing. The double unit shown contains several type NR oil switches, and high voltage primary terminations and fusing.

L-M's TransclosureTM Housings Economical For All Types Of Distribution Equipment

Modular construction and range of sizes ideal for all types of equipment including transformers, regulators, reclosers, switches, protective equipment, controls, meters, capacitors, load transfer equipment, arresters, buses and insulators.

L-M Transclosures are fabricated steel housings featuring modular design. They can be installed singly or ganged, in a variety of sizes, to house almost any imaginable type of distribution equipment. Additional units may be added at any time.

You have complete flexibility of installation. Transclosures can be installed outdoors at ground level on concrete pads for underground distribution. They are equally versatile on roof tops or indoors. You can install them anywhere. They eliminate the need of expensive vaults or masonry cubicles.

Adequate ventilation is provided for all equipment. Vents at top and bottom have baffles preventing the entrance of all foreign objects, including wildlife. Removable panels can be locked in place to prevent the entrance of all unauthorized personnel.

Get Specifications, Details

Contact your L-M Field Engineer. He's anxious to discuss your enclosure problem with you. Ask him for Bulletins on L-M Transclosure housings. Or write Line Material Industries, Milwaukee 1, Wisconsin



L-M TRANSCLUSION HOUSINGS are used at Sapulpa Memorial Hospital, Sapulpa, Oklahoma. Three Transclosures are ganged to house two 50 kva, one 75 kva distribution transformers, and current transformers. This cabinet is shown at end of unit. Construction, including assembly and bolt torquing required only 8 man-hours of labor.

LINE MATERIAL[®] Industries

McGRAW-EDISON COMPANY



Transclosures

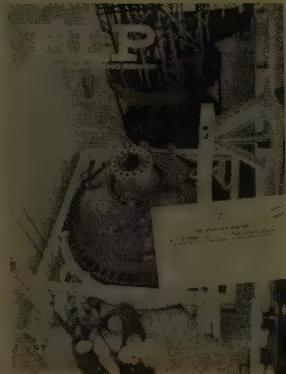


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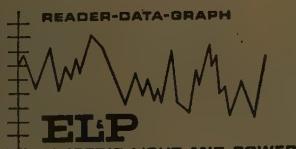


OUR COVER

el loading operation at Dresden nuclear Power Station has already given Commonwealth Edison crew valuable experience in specialized handling of uranium fuel bundles, which are carried 16 at a time in a rack basket (lower foreground) from storage vault to reactor. Dresden operators expect to schedule first re-loading about mid-1962.

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Publishers Design Service, Art Direction



November 1, 1961 Volume 39, Number 20

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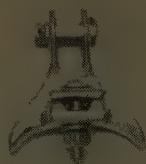
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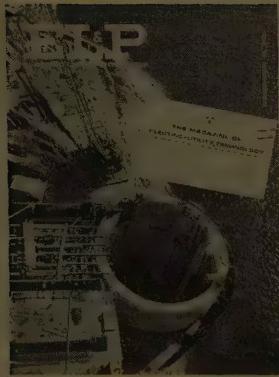
ELECTRIC LIGHT AND POWER



THE MAGAZINE OF ELECTRIC-UTILITY TECHNOLOGY

November 15, 1961

Volume 39, Number 22



OUR COVER

orm work takes shape for pouring of concrete on the \$1-million "smokeless" stack that will rise 515 ft above the Ohio River at the Walter C. Beckjord Station of The Cincinnati Gas & Electric Company. The crib house and stack are part of the fifth generating unit now being installed in that station.

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EVALUATION OF TIE CAPACITY BETWEEN POOLS OR SYSTEMS..... 33

Economic worth of tie capacity, measured by benefits derived, is found by new analytical procedure.

By H. E. LOKAY, Sponsor Engineer, and M. S. SCHULTZ, Ass't. Sponsor Engineer, Electric Utility Engineering Dept., Westinghouse Electric Corporation

NEW METHODS SPUR INTEREST IN RESIDENTIAL UNDERGROUND SERVICE..... 38

Full collaboration in planning and installing services cuts costs, avoids duplication, gives impression of "packaged" job.

By BERNARD W. HAFELI, Underground Lines Dept., The Detroit Edison Company

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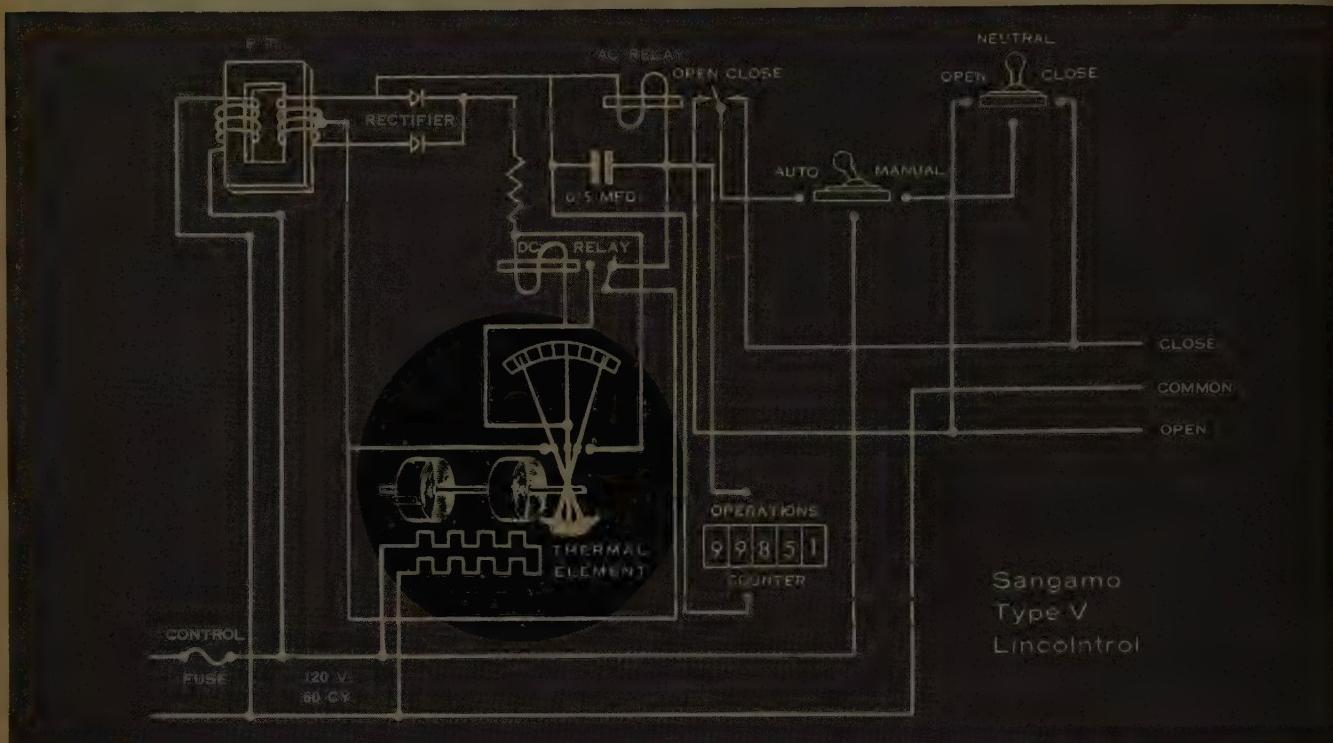
Difficulties on relatively new 69-kv line lead to intensive tests and adoption of new standards.

By DONALD B. GREGG, Montana Power Company

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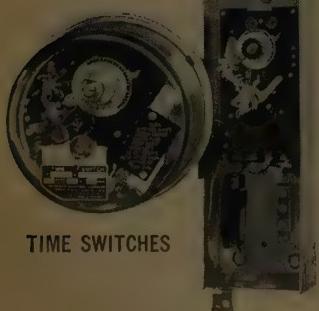
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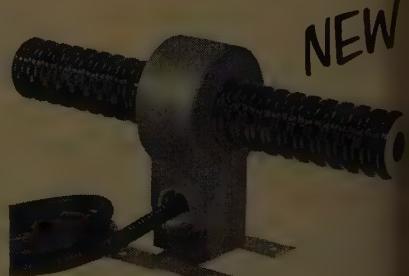
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ELECTRIC LIGHT AND POWER



THE MAGAZINE OF ELECTRIC-UTILITY TECHNOLOGY

December 1, 1961

Volume 29, Number 23

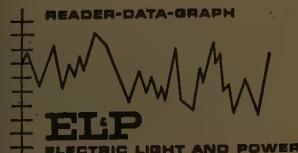


OUR COVER

construction photo is indeed
dry as it was taken north of the
circle. The pole being raised
part of a 20-kv line for the
Alaskan State Power Board.

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STORED-WATER SPACE HEATING IS PRACTICAL WHEN USING OFF-PEAK POWER..... 23

Results of tests using various off-peak-heating arrangements prove this concept is practical.

By STANLEY B. TUPPER, Market Development Division,
Bell & Gossett Co., and RAYMOND J. VERTOVEC, Engineer,
Space Heating Department, Commonwealth Edison Co.

MERCER GENERATING STATION DESIGN IS UNIQUE..... 26

Many advanced-design concepts are incorporated in this new 640-mw generating station.

HOW UTILITIES CAN CUT BENEFIT PLAN COSTS..... 28

Employee benefit plan costs are coming in for their share of scrutiny; some methods for control are mentioned.

By C. CHARLES BURNS, Consultant,
Commonwealth Services, Inc., New York, N. Y.

ARRESTER RELIABILITY PROVED BY UTILITY FIELD TEST..... 32

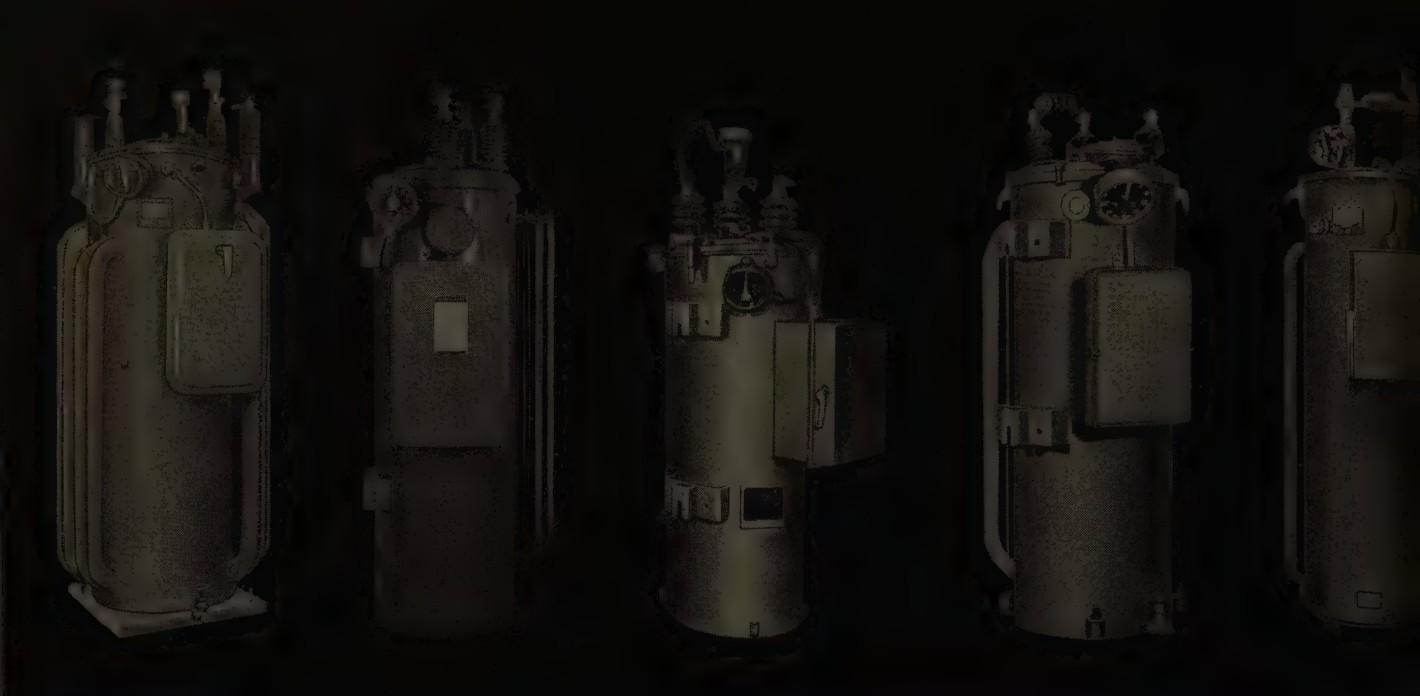
Tests show that true valve-type arresters do not "wear out" while performing intended service duty.

By T. J. ALLEN, Superintendent of Transmission,
Operating Department, Georgia Power Co. and
E. J. ALLEN, Manager Station Equipment Sales,
Lightning Arrester and Cutout Product Section,
General Electric Co.



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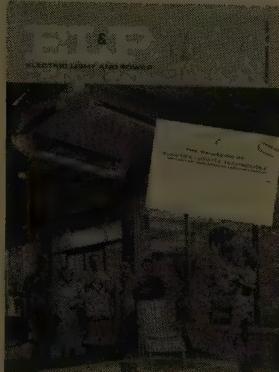
ELECTRIC LIGHT AND POWER



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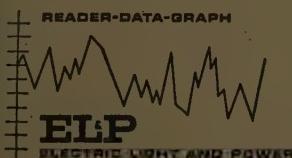


OUR COVER

JULY IN DECEMBER — electric heaters installed above the sidewalk in front of the Burns Department Store, Laureldale, Pa. turned December into July for Linda Rosser as she posed in a simulated beach scene to demonstrate the effectiveness of the heaters. Photo courtesy Metropolitan Edison Co.

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QUALITY SERVICE ATTRACTS INDUSTRIAL CUSTOMERS.....

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Standard designs, bulk purchases, and planning ahead help to provide quality service at reasonable competitive rates.

By L. V. DUGAS, Manager, Industrial and Commercial Sales,
and Y. L. HUGHES, Supervisor of Project Engineering,
Gulf States Utilities Co.

METERING DIFFICULT LIQUIDS WITHOUT LEAKAGE.....

42

RG&E specified a feed system in which there is no leakage and chemicals are isolated from working parts to stop corrosive liquids from raising havoc with pumping equipment in Alex Beebee station.

MICROFILMING CUTS FILE SPACE, ADDS SECURITY.....

44

Iowa Electric Light and Power Company has found that microfilming is a fast, low-cost method of preserving original drawings, cutting storage requirements, providing security of duplication and helping retain sequence of revisions.

UNIQUE ELECTRICAL SUPPLY USED FOR MARINA CITY DEVELOPMENT.....

46

This twin 60-story circular-tower apartment project with its all-electric feature and limited space available provided a real challenge in the design of an electrical-supply system.

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EARLIER ROLL DATES AT ALAMITOS

The 660,000-kw expansion of Southern California Edison Company's Alamitos Steam Plant is being completed on a fast schedule that was substantially tightened after construction started.

Two 330,000-kw units—computer-controlled—are involved. Unit 3, now on the line, beat the calendar by 30 days; next Spring's roll date for Unit 4 has been advanced 60 days.

With over 900,000-kw capacity, Alamitos becomes the largest plant in a system that Edison is constantly expanding to keep ahead of Southern California's phenomenal demand for electric power.

As on the original Alamitos plant, completed in 1957, Bechtel is responsible for engineering and construction of the expansion—working closely with Edison engineers.



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ECONOMIC CLIMATE

OPTIMISM FOR 1961 is voiced by economists to the U. S. Chamber of Commerce. Total output of goods and services will set new records, but unemployment will be a serious problem, especially in the year's first half. During the second six months, a rising economic trend will make itself felt once more, as businessmen start slowly to re-accumulate inventories. Fastest-growing single segment in the economy will be government. There will be federal deficits in both the current fiscal year and the next, amounting as much as \$5-billion. State and local bodies will expand their spending. Here, briefly, are the industry forecasts given to the Chamber's Board of Directors:

FINANCING will be needed to maintain anticipated high levels of business, and Federal Reserve is expected to see that ample funds are available. Business is more sluggish than expected, some loan funds may go unused. Though interest rates may ease, there is indication of a sizable drop in the cost of money. Loan demand is expected to be higher in the second half of the year than in the first. Consumer credit is going to sustain a modest growth.

CONSTRUCTION will go up about five percent, with a modest advance to be ordered in building by utilities. A new rise will take place in residential construction, with about 1,325,000 new non-farm units to be started. Moderate gains are anticipated in commercial and other nonresidential building.

AUTO SALES will be slightly smaller in 1960's estimated 6.7-million units. The 4-million will be conventional size, but 400,000 will be imports, and 2.1-million will be compacts. Truck output will go to 1-million units.

STEEL PRODUCTION will hold steady at approximately current levels--almost 100-

million tons of ingot. Sales of metalworking industries will rise five percent. Price of steel will go up.

OUTLOOK FOR 1960 is appraised in special economic reports from EL&P's regular contributors: A. C. Farmer on p. 24, Ephraim Kahn from Washington on p. 25. They, too, identify most signs as justifying optimism.

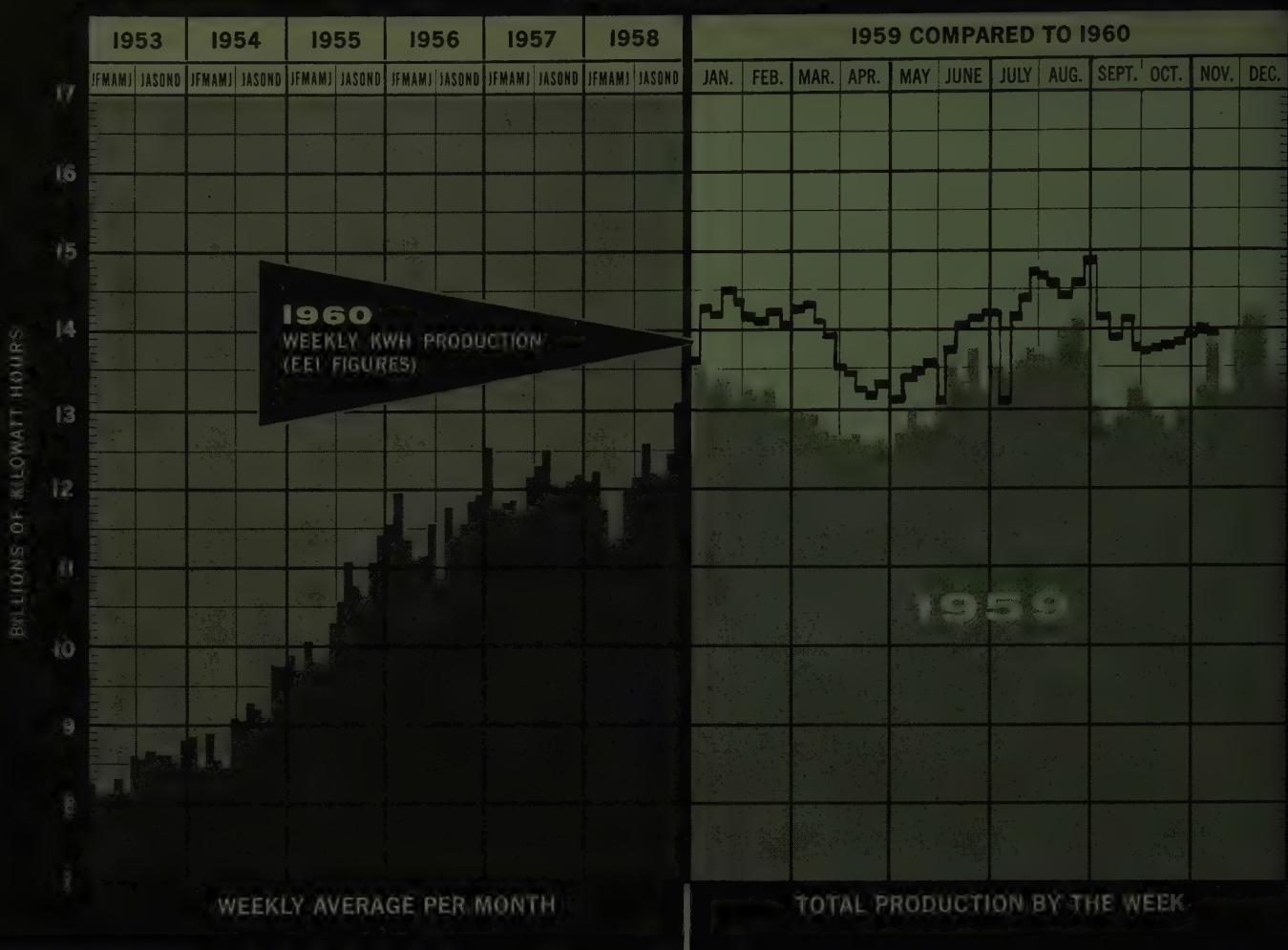
MANAGEMENT VIEW

"MAN-BOSS RELATIONSHIPS continue to be a weak link in the communications channels of many companies . . . but, this weak link can be strengthened" . . . This is the view of Detroit Edison's Virgil K. Rowland (asst. to the Pres.), whose contention of the need for improving standards for management personnel are presented in recently published book, "Managerial Performance Standards," distributed by the AMA. The book offers step-by-step plans to show how standards can be applied to executive performance. (Promising sample of an evaluation system that works: So. California Edison's "sales effectiveness rating"--see p. 30.)

AREA DEVELOPMENT SPURS—Should they come mostly from business, or from government? Union Electric's McAfee urges reliance on business as the "safer" way, a surer way to produce a sound, worthy result. Speaking to the recent EEI area development workshop (reported on p. 43), Mr. McAfee emphasized that nobody has a greater opportunity, nor a greater interest in helping an area grow than do public service organizations. Latest examples of this leadership in action: The all-out effort in 250 communities in Northern Indiana Public Service Co. territory, directed by NIPSCO's Pres. Dean H. Mitchell; the long-range, statewide program launched in Lincoln, Nebraska, under Wayne E. Barber, president of Consumers Public Power Dist.—this one oriented in organization more strongly to government agency participation.

Electric Utility Barometer

(Source: Edison Electric Institute)



NEWS IN PERSPECTIVE

A "PUBLIC FUTILITY"—That's what a financially-starved utility becomes, newly-elected NARUC Pres. Peter E. Mitchell said in his acceptance speech. This indication of support for free enterprise in the utility business, from the California PUC member, was reiterated in other messages offered to the 72nd annual convention last month.

FORCES OF COLLECTIVISM are constantly at work throughout the service territories of private power companies, So. California Edison's Pres. J. K. Horton reminded an industry audience recently. He reported that among the programs a utility can utilize to combat such forces, for example, is a school program that recognizes the lack of factual material in schools today on the private power side of the question. "After a year of participation in the 'Power in

Our Lives' program (created by the Paul S. Amidon organization of Minneapolis), we are satisfied that this material is presenting the story of private power development in a factual, intelligent and acceptable form . . . and most importantly, is being actively used. It represents the successful beginning of a program we plan to augment in successive stages in the years ahead," he concluded (See page 20.)

TOP MANAGEMENT COMPENSATION has been rising steadily at the annual rate of about five-percent, according to another AMA report, this one from the Association's Executive Compensation Service. One trend: a greater emphasis on compensation stability. With 6.5-percent of the executive's salary currently going into contributions for retirement programs, some 80-percent of his total compensation is now paid in salary, says the AMA study.

WASHINGTON INFLUENCE

"VIGOROUS AND IMAGINATIVE" is the way s.-elect Kennedy wants his Interior secretary to administer his department. ly-appointed Stewart L. Udall can be elected to interpret this policy aggressively . . . and the play he gives his own public-power bias may be bed only by the hard realism of the Administration's strained budget. p. 22 EL&P's Ralph Elliott views the look politically in the capitol.)

HUGE POWER NET will be feasible by 1963, when it will be possible to e an interconnection from the Pacific thwest to the TVA. This would include e systems on the Gulf Coast and extend th of TVA to systems in Virginia, yland, and Pennsylvania. An Interior partment spokesman asserts "this will a big day for electric utilities, both lic and privately owned . . . because erience has shown that system inter- nections result in increased capac- es and a mutual savings in energy eration by virtually all the partic- ing utilities."

POWER SURPLUS IN NORTHWEST now pre- lls, for the first time in a decade, ports BPA Administrator Wm. A. Pearl e p. 21). And, he predicts, all loads be met for the next ten years, even er critical water conditions. (For endar year 1960, BPA's construction get calls for expenditures of \$19- lion, contract construction work of 45-million.)

SNAKE RIVER projects at Mountain eep or Nez Perce are not necessary at s time, according to the Interior partment. If the U. S.-Canada Columbia river treaty becomes final, other power es will be available and construction these sites can be put off until the sh problem is solved. John J. Burke, esident of Pacific Northwest Power Co., serts that "it would be dangerous to op or delay development of High Moun- in Sheep because of hoped-for benefits m the proposed treaty with Canada." adds: "it is essential for the future wth of the region that the High Moun- in Sheep Dam be built and the region's

favorable power supply be maintained." Meantime, FPC has allowed Idaho Power Co. to postpone further construction of permanent fish collection facilities at its Oxbow Dam on the Snake River.

MORE POWER will be available through 1963 to about 250 preference customers in the Eastern Missouri River Basin. The Bureau of Reclamation has approved one pact for purchase of supplemental power; it is negotiating another. They will assure almost 100-percent of power needs to these customers. The Assistant Commissioner of Reclamation notes that "at the request of representatives of preference customers, the Bureau will obtain and sell supplemental power on an 'if and when available' basis. The Mis- souri River Basin Project does not have enough firm power to meet customer load requirements, despite the fact that all firm power will go to preference users."

HEADWATER BENEFITS investigation of the Kanawha River has been launched by FPC. Purpose is to enable FPC to determine whether federal upstream improve- ments indirectly or directly benefit non- federal downstream water power projects. If there are power benefits, a charge for them will be made.

BASIN-WIDE ACCOUNT, in which revenues from a whole system of powerplants and participating projects are pooled, may be necessary for ultimate development of the Lower Colorado River Basin, accord- ing to Reclamation Commissioner Floyd E. Dominy. He also anticipates an early decision on the plan advanced by six utilities to construct certain elements of the Glen Canyon transmission system.

EXTRA-HIGH VOLTAGE lines are being built experimentally by TVA. At a cost of about \$100,000 a mile, it is building a 7-mile section of 460,000-volt line, which will be operated initially at 161,-000 volts, TVA's present top transmission voltage.

INDUSTRY SIFTINGS

GE'S "PROJECT EHV," a huge 4.3-mile outdoor laboratory built near Pittsfield, Mass., to experiment with voltages as

NEWS IN PERSPECTIVE

high as 750,000-volts, now gives the U. S. the edge over Russia in this important area of technology. Energized and demonstrated for the first time last month, "Project EHV" is a \$7.5-million bet (\$6-million by GE, the rest by 12 other companies) on one solution to the problem of carrying the tremendous electrical loads of the future: stepped up voltage to carry more power over fewer lines.

MT.-TOP STUDY OF LIGHTNING is being planned by GE and the Pennsylvania Elect. Co. for the next several summers (where electrical storms occur 38-40 days each season). Two engineers will live in a lightning-proof trailer, from which they will observe instrumentation connected to Penelec's recently energized 13-mile, 460-kv transmission line located a few feet away.

SAFETY RECORD RECOGNITION has been given to employees in ceremonies staged by many of the utilities receiving the more than 60 Safety Achievement Awards authorized by EEI last year. In Apr.-Oct. performances, employees of Detroit Edison and New Orleans P.S. had achieved 3-million man-hour status, while employees at Baltimore G.&E., Cincinnati G.&E., Monongahela Pwr. Co. and Pennsylvania Elect. Co. had reached the 2-million man-hour mark without disabling injuries. A more recent addition to the 2-million group: Commonwealth Edison Chicago-Central Division employees, first in the utility's history. (For report on EEI accident prevention committee meeting, see p. 42.)

APPLIANCE UPTURN BY MID-'61 has been predicted by John W. Craig, Westinghouse Appliance division chief, who forecasts that the climb can be expected to carry through the end of '62. A big spur, early in the new year: National Electrical Week, with its "umbrella" promotion of the '61 theme—"Make Electricity Work for You." In developing participation, more than 8000 industry leaders have been working from planning guides since last November.

NEWEST NUCLEAR POWER PROJECTS—In California, So. California Edison has

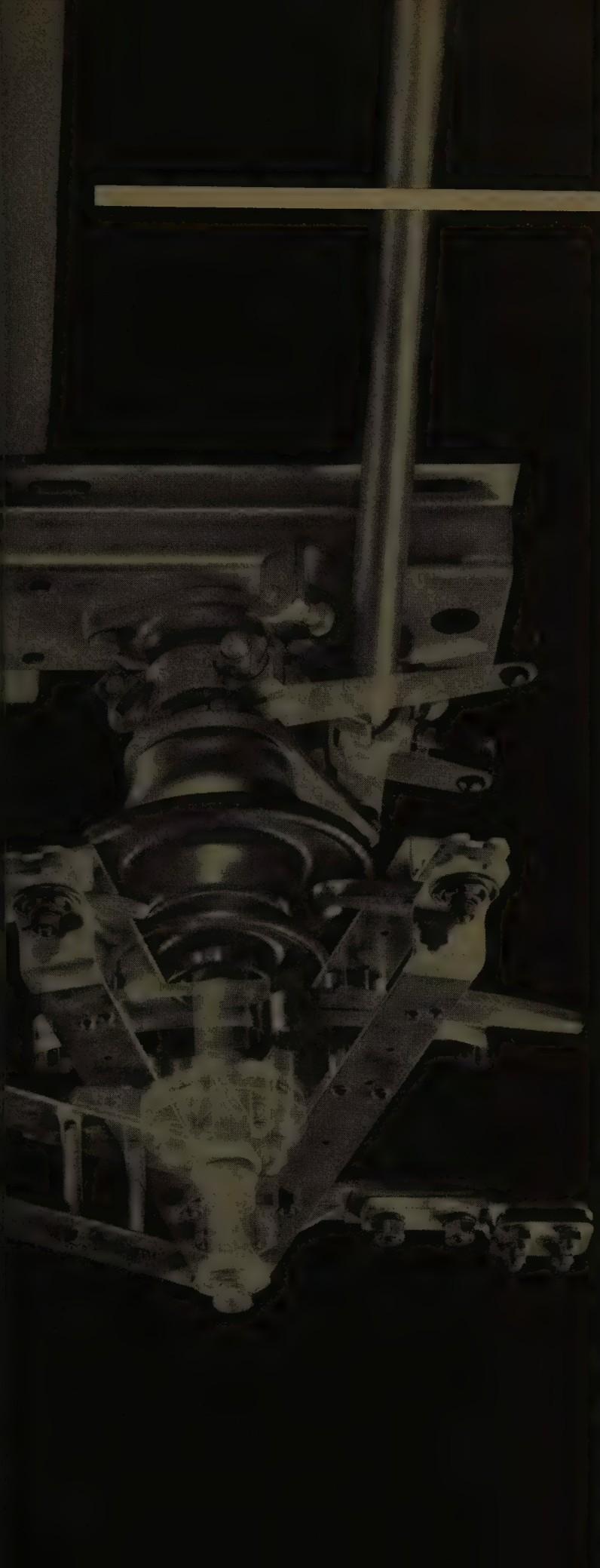
concluded negotiations with Westinghouse and Bechtel, intends to proceed with its plan to build a \$78-million 375,000-kw (gross) A-plant, but in mid-December was awaiting determination of contract arrangements with the AEC; in New York, seven investor-owned utility organizations formed the Empire State Atomic Development Associates, Inc. (ESADA) plan to build an \$8-million superheat development reactor to help extend the technology applicable to large-scale power-plants use in the years after the test unit will be in operation (in 1962).

OPTICAL READING MACHINE, recently announced by IBM, can be linked to a solid-state computer to automate paperwork jobs in utility industries, among others. In such a system IBM's 1418 unit reads numerical data—at rates up to 480 numbers/sec—printed with ordinary ink on customer bills into the magnetic core memory of the 1401.

GE PRICES: UP, DOWN—Adjustments in prices on open cutouts (down from .5 to 2.3-percent for some items; up 3-percent on others) and for certain switched pole-type capacitor equipment (down 4.6-percent) were made in November to bring prices into line "with relative manufacturing costs . . . and to the current market level."

"FREE" ELECTRIC SERVICE came to the customers of one Washington PUD—Clatskanie—for the second month in 1960 and for the fifth time in five years. "Bonus" (averaging \$20 per customer) is on top of "one of lowest rates in the U. S.—an average of less than 8-mills/kwh for residential customers."

MANUFACTURERS' GUILTY PLEAS in the Government's antitrust indictments, on advice of counsel, amounted to an "only choice" position. Even where companies could show unequivocally that admitted acts of certain employees were not authorized and/or positively forbidden by company policy in writing, the companies had to accept legal responsibility. General Electric commented: This development shows that GE's decentralization policy exposes the Company to risk of occasional mistakes by individuals; however, the Company intends to continue this policy . . . because it does encourage optimum individual and corporate performance.



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Now from S&C you can get load interrupters at the same price as disconnects. This means that you can handle any kind of line switching in the simplest way at the lowest possible cost.

Here are the devices that do it:

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2. The Double-Break Alduti Load Interrupter at 23 kv and 34.5 kv.

Both give you load dumping* (full 600-ampere arc-free load switching at full line voltage) along with loop sectionalizing (switching currents in parallel or loop circuits) and line dropping (switching line charging currents).

Since these switching duties at today's voltages and loads can't be handled by disconnects, why not compare the cost of S&C Load Interrupters with disconnects. You'll find there's no premium price for premium performance.

Here are some of the other advantages of S&C Load Interrupters:

- 600-amp load switching without line or feeder breaker openings
- a maintenance-free interrupting device
- no external arc
- can be mounted in any position . . . vertical, upright or inverted.

For more information, please contact S&C Electric Company, 4431 Ravenswood Avenue, Chicago 40, Ill.

* Important because: (1) Emergency situations (wires down, etc.) demand quick action, hence dumping the load. There is no time to set up communications for complicated breaker and switch sequencing. And (2) there's always the possibility of an operator error or misunderstanding, with the result that a loaded circuit may be dumped inadvertently.

S&C ELECTRIC COMPANY





MANAGEMENT-MARKETING

"Part-time" Utility PR Decried by J. K. Horton

There is no such thing as a *single* "corporate image," there is no pat formula for building the better "corporate image" . . . and, in any case, "part-time" public relations will no longer do that job.

For the recent EEI Industrial Relations Round-table Conference, the president of Southern California Edison explored these all-important conclusions experienced in a highly successful utility company public relations effort. In submitting them, the utility executive, J. K. Horton acknowledged that "our stature as an industry has improved considerably . . . but, we're fooling ourselves if we believe for a moment that our so-called corporate image is in good shape."

We as an industry have not been giving our public the whole picture, he declared. "We have engaged far too long in part-time public relations, and the day is now upon us when self-interest and self-preservation demand that we put in a good measure of overtime on this important subject or face the consequences."

Because each utility company has special geographical, political and environmental problems, there can be no pat formula for building a corporate image, Mr. Horton conceded. But, he said, there are guide posts, which, when intelligently adapted to individual circumstances, can assist in pulling together those forces within a company in a position to influence the company's image so that all are pointing toward the same general objective.

The Southern California Edison president listed these guide posts:

1. Our strengths and weaknesses—not necessarily as we see them; but as they really exist must be mapped out. This may well call for outside opinion research activities by professional experts whose find-

ings can serve as bench marks against which to measure future progress on the various programs undertaken.

2. A written policy statement should outline the forthright aims and objectives of the company and the image which management wishes to project. In our company we have given a great deal of thought to this subject and, in 1956, after picking the brains of our top management group, came up with a policy statement which sets the limits of our general company policy between which our management group can interpret day-to-day policies on specific problems as they arise. We have published a 66-page book called *Our Management Guide* and make a practice of presenting a copy to every supervisor.

3. The communications effort throughout the company should be integrated so that each point of contact with the public reinforces the



J. K. Horton

image the company seeks to build. Those organizations having the most contacts with the various publics they serve have a distinct advantage in establishing a familiarity in the minds of

the public. And, of course, familiarity breeds—not contempt in this case—but a high degree of acceptance. Highest familiarity is experienced by those companies whose employees are trained not only in the simple rudiments of meeting the public—but in the importance of projecting that company's image as if they were the only employee with which the public ever came in contact.

A consistent, repetitive pattern must be established in all our communications efforts. Once an ob-

(Continued on page 28)

Public Power Threat "Overrated": Survey

Will the change of administration in Washington result in mushroom growth of public power at the expense of the investor-owned utilities? "The Value Line Survey (a publication of Arnold Bernhard & Co., investment advisers) does not look for this to happen.

Instead, the Survey predicts in its first post-election issue that "electric utilities should continue to prosper." Announced plans for new generating capacity over the next four years suggest that the 75-25 ratio between private and public kwh output will hold in the foreseeable future, notes "The Value Line."

The threat of further inroads by public power appears to the Survey to have been overrated. A large segment of the utility industry, the "Value Line Survey" emphasizes is not affected by federal power at all. "Furthermore," the Survey observes, "the scope of Government expansion into the field is limited. Moreover, Government projects are not exclusively to the detriment of the investor-owned companies. Finally, an examination of the composition of the new Congress finds no important shift in strength in the public power-private power camps such as would support radical innovations in established policy."

The number of undeveloped hydro sites in the United States has dwindled to the point where vast new TVA-type regional programs cannot be justified on power development premises, "The Value Line Survey" observes. Rural electrification is virtually complete, so that expansion of public facility is no longer needed to extend the benefits of electricity to the countryside.

The critical areas to watch for the flare-up of public power, "The Value Line Survey" notes, are (1) atomic generation, where the pace of the



nition for effective advertising beneficial new England came to the New England System recently when Dr. Chas. F. Phillips, pres. of the New England Council presented a citation to New England Elect. System Wm. Webster (at left). (Another utility company honored recently: Georgia Power Co., winning the American Marketing Association's award of merit for its activities in improving state's business climate and image.)

sent construction program, privately financed, may be decried by electric power partisans as too slow, (2) attempts to create a national grid of government-owned transmission lines to interconnect federal power projects, which would logically lead to construction of additional government thermal generators.

However, in both these fields, says the Value Line, "the investor-owned electric utility industry has and is continuing to push vigorously ahead."

There is ample room, "The Value Line Investment Survey" concludes, both public and private power the growth of the nation's population and burgeoning economy.

Inquestionably, the most prominent example of the validity of this view comes from Pacific Northwest, where the Republican-nurtured "partnership" policy has developed significantly over the past eight years.

In a Dec. 5 issue of "The Value Line," Analyst Robert L. Schwartz assessed the significance of the recent U. S.-Canada agreement on cooperative development of the Columbia River. One thing is certain, he observed, "federal generating capacity will be expanded relative that of the private utilities." Further, according to Mr. Schwartz:

The fact that some expansion of private capacity will be deferred may prove beneficial in some cases."

Pearl: Power Surplus In Pacific Northwest

For the first time in well over a decade the Pacific Northwest finds itself in a period of power surplus instead of power scarcity, Bonneville Power Administrator William A. Pearl told Inland Empire Waterways Association convention recently. And, he predicted, addition of Canadian storage will permit all power loads of the BPA marketing area to be met through the next 10 years even under critical water conditions.

Administrator Pearl said new installed generation including both federal and nonfederal has increased approximately two and one-half times since the end of 1952 and currently the area has an installed capacity of 10,979,000-kilowatts. Federal or nonfederal projects representing 1,746,000-kilowatts are authorized or have had licenses granted. An additional 4,949,000-kilowatts in new projects are recommended or have requested licenses.

"Never in the history of the Pacific Northwest have we faced a brighter outlook for sound and continuing development of all aspects of our regional economy," Pearl said. "The power potential of the next 10 years that lies in Canadian storage, atomic energy and hydroelectric projects under construction or for which licenses have been requested will probably never be equaled."

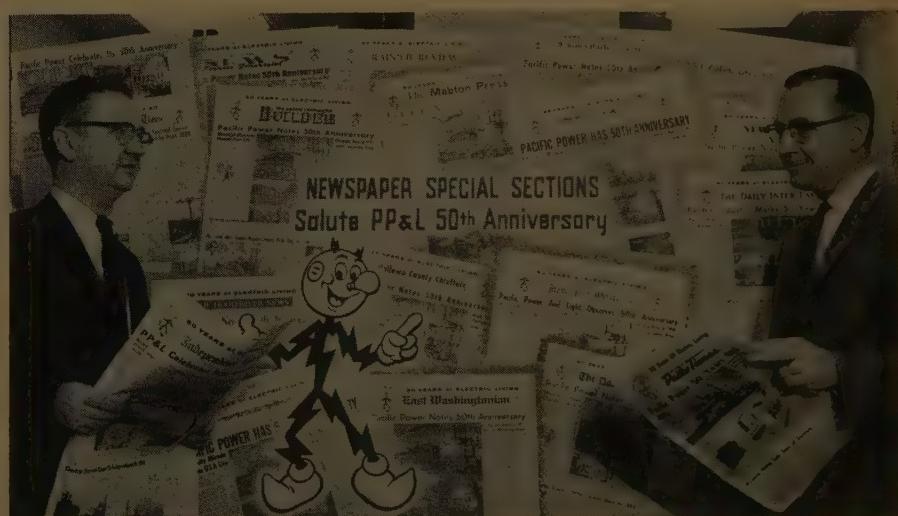
As a result of its recent offering of 364,000-average/kilowatts of combined firm and secondary power for industrial expansion, Bonneville Power Administration has had inquiries from aluminum, steel, phosphate, chlorine and caustic soda industries totaling 550,000-kilowatts above and beyond the block made available.

"When we realize the potential involved in Canadian storage, the Hanford atomic energy reactor and rapid nonfederal development, it is certain that many new industries will establish themselves in the Pacific Northwest and many existing plants will expand present operations," Mr. Pearl said. "Industrial growth of the area will also expand the market for large blocks of secondary power."

During fiscal year 1960 BPA sold 29.7-billion kilowatt hours of electric energy for about \$69,000,000 at an average rate of 2.32-mills per kilowatt hour.

Of this power, 35.7-percent went to publicly owned utilities, 18.8-percent to privately owned utilities, 30.1-percent to the aluminum industry and 15.4 to other industries and federal agencies.

Power operations on a cumulative basis through June 30, 1960, have returned to the Treasury more than \$717,000,000 of cash receipts, paying all expenses plus \$288,000,000 on the capital investment, or \$53,000,000 more than the scheduled amortization requirements to date, Mr. Pearl reported.



Was one utility company's 50th anniversary promotion successful? This is proof that Pacific P. & L. Co.'s (see E&P, Sept. 15, 1960, p. 43) was: special supplements from more than 40 daily and weekly newspapers in August-November issues saluting the utility's birthday commemoration. The utility spawned the one-to-ten page supplements with samples containing pictorial and editorial feature material, prepared by J. H. Ferguson, news director, and R. K. Foley, adv. manager.



Election Impact

With the election of John Kennedy as President, a flood of doleful speculation about what lies ahead swept over most of the American business community. The ultra-liberal, big-spending programs promised by the Democratic platform foreshadowed a throwback to New Dealism, or the development of something even worse.

But as the weeks passed after the election, appraisal of the immediate future by leaders of many business organizations seemed to take on a less pessimistic tenor. Some were seasoned with a generous dash of wishful thinking. Three factors, principally, were credited with taking some of the gloom out of the picture:

- The dollar's troubles, growing out of the drain on the government's gold stocks, would almost surely restrain Kennedy from wild spending and deficit financing—at least while there's no severe depression or national emergency. (Kennedy has already indicated the delicacy of the gold situation may call for some revision of his programs.)

- The conservative coalition in Congress, bolstered by the small but significant Republican gains in the House and Senate, could be an effective barrier against any runaway liberalism.

- The hairbreadth margin by which Kennedy was elected constituted no mandate for drastic revisions of national policy; and even though the President-elect might give this factor no weight, Congress would.

It is doubtful that the electric utility industry can afford to take much comfort from this sort of reasoning. Many vital changes in federal power policy being pushed by Kennedy advisors can be accomplished at the administrative level. At least one other, requiring legislation, calls for no expenditure of federal funds. And still others, for which appropriations will be requested, require no big spending initially.

A pretty good rundown of some major items the federal power planners will be ding-donging for, has been made by the biggest public power lobby in Washington—the National Rural Electric Cooperative Association. (NRECA general manager Clyde Ellis is serving, along with several other government power advocates, on the Natural Resources Committee of the Democratic Advisory Council.) In its *Minuteman* news letter, the Association recently advised electric co-ops that Kennedy will enter the White House "firmly committed to all-out support for rural electrification, the federal power program and natural resources development. . . . Since the philosophy of the Administration sets the tone and policies of administrative agencies, Washington observers expect significant changes in the electric power area."

In view of Kennedy's campaign statements on power issues and the Democratic platform, NRECA told its members, the following can be expected:

- An "early push" to start new multi-purpose projects already authorized but for which no funds have been appropriated. The projects would be located in eight states and would have total generating capacity of over two million kw.

- "Legislation to authorize the initial steps in the development of giant power transmission grids."

- Legislation of the Trimble Bill type "to set more realistic standards for (federal) project cost evaluation, cost allocation and payout period."

- "Substantial changes" in the power marketing policies of Interior Department.

- No Administration support for higher REA interest rates, or for private financing of co-ops.

- "Increased emphasis on REA's generation and transmission loan program."

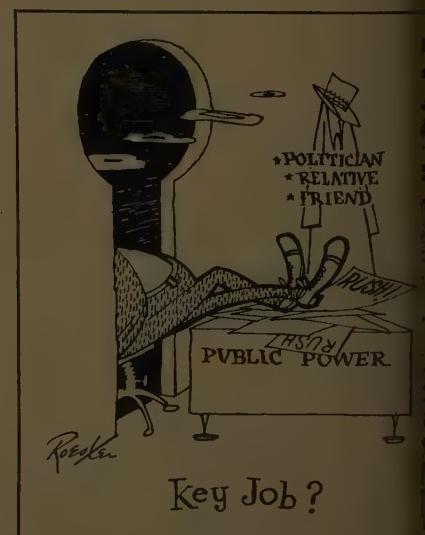
Omitted from NRECA's rundown, but high on the planners' list, are federal thermal and nuclear power

REP. UDALL'S APPOINTMENT
Secretary of the Interior in the President-elect's new cabinet was made after Mr. Elliott wrote this column. As expected, of course, this key post went to another Westerner—a member of the House Committee on Interior and Insular Affairs, and a Congressman since 1954. For the conservative Republican view of what is in prospect—expressed by another Arizonian, Sen. Goldwater—see EL&P, Dec. 15, p. 46.

plants.

No mature appraisal of how radically the new Administration may attempt to revamp federal power policy, or expand federal power activities, can be made at this writing. A picture with some meaning will begin to take shape, however, as Kennedy names the men to fill various power-strategic posts, particularly these: Secretary of Interior; Commissioner of Reclamation; REA Administrator; and memberships on the Federal Power Commission and Atomic Energy Commission.

Legislatively, the government power expansionists can be expected to play it cagey. Their blueprint for congressional action calls for promoting their schemes in easy stages so as to avoid dumping an over-dose of "liberalism" on Capitol Hill.



Ohio Commission Orders Cincinnati G&E: Use Actual Taxes Under Provisions of Section 167

is Order was the result of a hearing on an earlier application by the Company for a rate increase in the amount of \$2,238,000. The order issued by the PUC on January 15, 1960, reduced the Company's request by 30-percent. The hearing on the treatment of taxes under Section 167 reduced the amount by another 30-percent or an allowed increase of only 000.

its original Findings and Order PUC gave tentative approval to the Company to normalize taxes resulting from the use of Section 167, in so doing it noted that "... neither accepted the characterization of the reduction in tax liability as a 'deferral' nor attempted to establish a policy in the matter." Evidently this uncertainty prompted the Company to petition for rehearing on the grounds that the Commission erred in failing to determine as a matter of fact that the tax advantage offered by the use of accelerated depreciation would accrue "to taxpayers such as Applicant herein, as distinguished from Applicant's customers." The Company contended further that:

"The Commission should have determined, relative to this taxpayer option, the intent of the Congress relative to accelerated depreciation provision in the Internal Revenue Code of 1954, intended, was to make interest-free capital available to taxpayers such as Applicant herein, as distinguished from Applicant's customers. The Commission's in the foregoing respects resulted in failing to follow the law of Ohio and the United States, including the intent of the Congressional intent, and general supremacy provision in Article VI of the Constitution of the United States."

Considers Tax Cut a Deferral

The Commission employed Dr. L. R. Northwestern University as their witness to rebut the Company's argument. The Commission's witness noted in part the witness' contention that "... the present treatment of tax could only be con-

sidered a deferral if it could reasonably be shown that there would be a corresponding increase in taxes at some future date, and that for any normal going company no such increase would ever take place."

The Order continued:

"The mistaken notion that the tax reduction from the use of accelerated depreciation is a 'deferral' results from restricting attention to a single piece of property. That is, if a company added only a single unit of property, accelerated depreciation would result in depreciation deductions higher than straightline in the early years of its life and lower depreciation deductions in the later years of its life. *Federal income taxes, under these assumptions, would be lower in the early years than if straightline depreciation had not been employed, and correspondingly higher in the later years.** Dr. Eisner pointed out that as a matter of fact, the federal income tax is not levied on items of property but instead on income and that income taxes are calculated on income for an entire company as a whole."

Unlimited Growth: A Notion?

Interestingly enough, the PUC's Order noted in the preamble that: "The total amount deductible under the declining balance method over the whole life of the assets is, of course, equal to the net cost of the asset, as in the case of the straight-line method." In this particular instance it appears that the sum of the parts is somehow greater than the whole. In addition, there seems to be a preconceived notion that the utility industry will grow indefinitely without any recession or decrease in the rate of growth.

The witness for the Ohio PUC seems to make the argument on the one hand that it is possible to have income without any investment (presumably gambling on horses would be a good example) while on the other hand the amount of depreciation taken on this investment, which apparently does not exist, appears to be Dr. Eisner's primary concern.

The PUC citation of a US Court

decision seemingly upholds its position when it says:

"Furthermore, it must be borne in mind that an income tax is not a tax on property. (Graves v. New York, 306 US 466, 480-481, 83 L.ed.927,933) Therefore, the argument which attempts to attach liability to specific items of depreciable property overlooks completely the fact that the tax we are here dealing with is an income tax which addresses itself to net income and not to property or any specific items of property."

However, this is not well taken, since it is the duty of the Commission to administer the laws of Ohio applicable to utilities under its jurisdiction rather than to an extraneous ruling involving Federal litigation.

The Ohio PUC having cited a Federal decision to prove a point in its favor, reversed itself with remarkable celerity to take a "State's Rights" position when it noted from a Pennsylvania Superior Court Findings and Order (City of Pittsburgh vs. PUC) that:

"The utility, however, states that the provision relating to accelerated depreciation was a proper exercise of the power of the federal government to impose taxes, which is supreme; and that a state or its agency may not impede the exercise of this power. This rule of law, stated in the abstract, is of course generally correct, but it has no application to the present situation. The action of the commission here does not impede the federal government in the collection of its taxes, either directly or indirectly." . . . "In further answer to the constitutional question it may be said that Congress . . . certainly did not intend to usurp or qualify the Commission's delegated authority to regulate public utility rates, which is derived from the police power of the state and is a valid exercise thereof."

The Commission, after noting that all utilities in the State of Ohio had exhibited substantial growth in the past, and that Cincinnati Gas & Electric Company specifically had doubled its electric load, and tripled its gas load while spending some \$280-million since 1947, was no exception to this rule. Consequently the Order noted:

"The record in this proceeding makes it clear that this Company will continue to make new additions. Further, it indicates that new additions will be made at a rate far in excess of that necessary to offset lesser amounts of depreciation deductions taken for older assets. Our ex-

(Continued on page 28)

* Italics supplied

An Economic Forecast for 1961

PREDICTION: IN 1961 the tight-money program of the Federal Reserve Bank will be abandoned for an easy-money program . . . and the Federal Reserve discount rate will be lowered. The effect will be highly stimulating for general business activity and for the stock market—so there will be a rising trend of business activity through 1961 and 1962.

At the time our economic forecast was published in EL&P a year ago (Jan. 15, 1960, p. 66), the most important issue engaging the attention of business was the settlement of the steel strike. In this connection, the following statement was included:

"With the steel mills once more in operation, business activity will improve as steel flows from the mills to the factories, but the trend will not continue upward until the tight-money program again is relaxed."

A tight-money program comes into effect through increasing the Federal Reserve discount rate—the rate at which loans are made by the Federal Reserve Bank to the commercial banks.

To illustrate, step-by-step increases were made as follows in the Federal Reserve discount rate, beginning with April 1958:

April 1958	1 3/4 percent
August	2 percent
October	2 1/2 percent
March 1959	3 percent
May	3 1/2 percent
September	4 percent

When it became apparent in early 1960 that business activity was deteriorating and unemployment was increasing, steps were taken by the Federal Reserve Bank to reduce the discount rate.

Reductions began in June 1960:

June 1960	3 1/2 percent
August	3 percent

The reductions stopped at 3-percent. This was unusual, since in the previous action along these lines, reductions were carried from 3 1/2 percent (November 1957) to 1 3/4 percent (April 1958).

Another unusual development was that the reduction in the discount rate was accompanied by corresponding downward adjustments in the rates charged by the commercial banks.

It can be said that in 1960 the Federal Reserve discount rate was not reduced enough to supply stimulation to general business activity. The same



By A. C. FARMER

statement applies to the rates charged by the commercial banks.

This fact undoubtedly was a major contributing factor in the defeat, on November 8, of Vice-President Nixon.

In his campaign speeches, President-elect Kennedy promised lower interest rates in the event that he became President of the United States.

It can be concluded that in 1961 the tight-money program of the Federal Reserve Bank will be abandoned for an easy money program, and that the Federal Reserve discount rate will be lowered. (Under the Constitution the Federal Reserve Bank reports to the Congress, and to the Congress alone, and it can be presumed that Congressional approval for an easy-money policy will be forthcoming.)

The effect of an easy-money policy, with lower interest rates on borrowed money, will be highly stimulating for general business activity and for the stock market. It can be concluded that a rising trend of business activity will be experienced through 1961 and 1962.

The gold problem would appear to present difficulties to the establishment of a low interest rate program, but in spite of this, the program will be put into effect since means other than high interest rates can be employed to prevent the continued erosion of the gold stock of the United States.

Serious hazards, however, are involved in the adoption of a policy of low interest rates. Inflationary trends in prices will be one of the difficulties that will be encountered. Higher wages will be demanded and will be obtained. Ultimately steps will have to be taken effectively to deal with a monetary inflation that otherwise will threaten to get completely out of control. In effect, this would mean that after experience with low interest rates over the next two years, probably it will be found necessary, because of price inflation, to abandon an easy money, low interest rate policy.

Next month a forecast will be included discussing probable developments with gold and with money over the next four years.

Economic Outlook for 1961

EAR OF BALANCE, tinged with uncertainties, ears to be in prospect. Even in terms of past n, it will not be too bad, however, and the nces are good that by the time 1961 has ended, records will be set for total annual value of ts and services. Readily seen stimulants to the omy include heightened government spending high personal incomes. Biggest problem will be ng unemployment, but a business upturn ex ed after mid-year will do much to palliate it. be sure, there's a dour viewpoint, too: gross onal product could drop significantly under \$500- ion a year, with no turning point imminent. For- ately, this pessimistic attitude is held by a small ority. Most conservative government economists e a far brighter attitude. In general, it is believed decline in the first half of the year will give way ains during the second half.

VERNMENT SPENDING will be the economy's major ulant. The military have already started to place racts more rapidly, and the pace will quicken he new Administration obtains more funds from gress. Federal expenditures will go up by billion or so in 1961, in large part because of er defense costs. State and local governments also continue to spend more money—probably east \$3-billion and perhaps as much as \$4-billion e than in 1960. If business threatens to sag ply, government outlays could be boosted by o \$10-billion—with at least two-thirds being spent he federal government.

VENTORY POLICY will be a key to the recovery that xpected in the second half of the year. There will ew eager buyers, anxious to stock up to meet is far in advance. But the stronger trend of ness will first curb the tendency to liquidate ntory (at best a difficult one to maintain for an finite period of relative stability in price and lability) and then force expansion of stocks. pite much talk of inventory liquidation in 1960, year actually was one of sizable growth in stocks. 1961 rolls on, inventories will start to become er. But figures for the year as a whole probably show a net inventory liquidation. The change irection will be far more important than the unt of gain. It is worth noting that ratios of ks to sales have not gotten out of line in most nesses through the entire cycle.

INDUSTRY CONSTRUCTION PROSPECTS underpin much e guarded optimism that pervades the economic ock. A rise of 4-percent, to a record \$57.3-billion, ficially expected, though some well-placed econo ts would not be surprised at some shortfall. 1961 turns out to be the second highest year on

record (despite an anticipated slight drop in actual physical volume of work put in place), it would do much to help build confidence. Present expectations are that private nonfarm residential building will move up 3-percent, to \$22.6-billion out of a total private construction volume of \$40-billion. Public utility construction outlays passed \$5-billion in 1960, and they will move up in 1961. Electric light and power construction, apparently related to the long-term demands of the economy, seems to have stabilized at slightly more than \$2-billion annually. Construction by gas utilities in 1961 will be worth a comparable sum. Public works of all sorts, about \$16.2-billion in 1960, will go up five percent, or \$850-million, in 1961. Much of this will be for highways and schools. Spending for conservation and development projects will reach nearly \$1.4 billion—almost double the 1955 rate—with its sixth consecutive annual increase.

PLANT EXPANSION will decline slightly in 1961. With production capacity ample, there will be lessened incentive to build new plant. But competitive pressures will spur modernization and automation of equipment. Depreciation reserves are generating substantial amounts of cash, and this will encourage a rate of investment that, at the worst, should not fall over 10-percent short of this year.

INDUSTRIAL PRODUCTION will not provide much encouragement during the early part of the year. Ending 1960 on a note of stability, but below previous highs, the output index may drop as much as five-percent. But it will move back up later in the year, and probably will exceed the 1960 low during the last quarter of 1961. A rise of at least five-percent can be expected in steel and other basic metals.

PRICES WILL RISE a bit during the next 12 months, but no more than a two-percent gain (if that) is expected in the Consumer Price Index. A somewhat more noticeable increase will take place in wholesale prices, adding to the squeeze on corporate profits. Costs of services are in a rising trend that will continue throughout the year. Food prices will be steady for most of 1961, though there are portents of a slight dip late in the year.

CONSUMER SPENDING, strongly influenced by personal incomes, will have few drags in 1961. Biggest deterrent to free spending will be psychological. Though employment—and wages—will be high, unemployment will tend to increase during the year's first half, new entrants to the labor force will find it difficult to find jobs, and employed workers will be cautious about making major purchases. Chances are, though,

(Continued on page 28)

that consumer credit will continue to expand modestly, and that repayments on credit will hold steady at about 13-percent of disposable income. A moderate rise—about five-percent—in consumer incomes is in prospect, which will probably more than counterbalance timidities induced by economic uncertainty. Many pace-setting industries are already committed to hike their workers' pay in 1961—and unions will start from this higher base when they start to negotiate for new contracts later in the year. Major wage negotiations in 1961 will be held by the auto union, which may renew its demand for profit-sharing.

SHAPE OF 1961, in terms of the dollar value of U. S. output of goods and services, is more like a saucer

than a teacup. It will be measured in tiny, possibly fractional, percentage changes. With final figures for 1960 not yet available, it can be assumed that the year ended with Gross National Product at an annual rate of \$505-billion. This will dip to a low of \$500-billion, probably in the second quarter of 1961. By the end of the third quarter, the economy should be running at a clip of at least \$505-billion. At year's end, the rate should be significantly above \$513-billion—and according to some optimists, it may go up to a rate of \$517-billion. For 1961 as a whole, however, the average will be little more than \$3-billion over 1960—a year that ended on a note of softness but which saw the U. S. economy touch new highs in many areas.

REGULATORY—Cont. from page 25

perience indicates that this will be true in general of utilities in this State. In these circumstances and in view of the convincing testimony of Dr. Eisner, we must reject the theory that a deferral of tax liability arises from the use of accelerated depreciation, and consequently must reject normalization of taxes for rate making purposes; no such deferral exists and no such liability will arise. We will allow only the expense incurred, that is, the federal income tax *actually paid* by the Company. It is our opinion that this treatment will benefit both the ratepayer and the utility."

Question Benefit to Taxpayer

That this treatment will benefit the utility and the ratepayers is open to some serious question, as is evidenced by some testimony before the Georgia Public Service Commission in the application of Georgia Power Company for instructions with respect to accounting treatment for liberalized depreciation. In this proceeding, the Georgia PSC referred to the testimony of Mr. Herman W. Boozer, vice-president in charge of Finance for the Georgia Power Company, as follows:

"Witness Boozer further brought out in his testimony that Georgia Power Company's rate of return, computed under the Commission's rule that no return is allowable on the funds accumulated from deferred income taxes, is presently a little more than 6-percent. He stated that if Georgia Power Company had to replace the \$30,000,000 of interest-free funds presently available from deferred income taxes, with a like amount of regular securities, the Company's rate of return would decline by four-tenths of a percent; and, inevitably, even if not immediately, Georgia Power Company would have to seek increased rates to provide additional revenue to cover the capital charge on this \$30,000,000. Witness further stated that under present money



Repetition of ads like this has been judged successful in getting across Con Edison's message: The big NYC utility is doing something about air pollution. This one refers to efforts to solve a particularly tough spot—smoke emission at the utility's East River plant, where \$20-million is being spent on control. In recent months, too, a somewhat unsympathetic local press has been convinced of the soundness of the ConEdison efforts. Hoping to switch to gas for boiler fuel, ConEdison looked for Supreme Court action to uphold utility's bid for FPC to approve proposed well-head purchases.

market conditions such added financing would require \$2,100,000 for return, plus an additional \$1,500,000 for income taxes or a total of \$3,600,000 more each year from the ratepayers."

The Georgia Commission came to the conclusion that taxes arising from Section 167 are deferred, and consequently permitted normalization both for accounting and for rate-making purposes.

HORTON—Cont. from page 22

jective is determined and once a means with which to accomplish that objective is formulated, it is important to follow through with a program which repeats the central theme over and over again.

Mr. Horton referred to his company's plans for reaching one group which "figures in the future of our industry most importantly." He said this group is what merchandising experts call the "youth market."

"This is an interesting group of people and, I might add, a taken-for-granted group of people. I refer to school-age children—all 40,000,000 of them. Individually they are my children and yours. Collectively, however, they are a most important—and overlooked—audience for the story of free enterprise in electric power production. They are the products of the New Deal and Fair Deal philosophy, and most of them have been exposed to the story of the investor-owned electric industry only by accident.

"We in Southern California Edison Company, in concert with a number of other companies in our industry, have undertaken a school program which we feel will go a long way toward balancing the scale in this critical area. I refer to the 'Power in Our Lives' program created by the Paul S. Amidon organization in Minneapolis. This program recognizes the lack of factual material in schools today on the private power side of the question but—just as importantly—recognizes the absolute necessity of presenting the story of private power development in a factual, acceptable form.

ATOMIC ENERGY PROGRAM, under the new Democratic administration, is not expected to change materially, though more federal money may be made available for national laboratory work. However, observers expect that there will be a question of the "commission" form as in the Atomic Energy Commission function; and, it is also felt in quarters that efforts may be made to separate "quasi-judicial" from "promotional" functions of the AEC. (Meanwhile, the AEC acted just before election time to reorganize its Div. of Licensing and Regulation to "accommodate growing regulatory responsibilities and safety standards development and further studies of its regulatory system are being made.) Chairman of the Joint Congressional Committee is to be Rep. Chet Hollifield (D., Cal.).

NATIONAL "SITING" POLICY is needed to avoid considerable time-loss now involved in launching new atomic energy projects, Rep. Hollifield advised the day after the election in a letter to Oliver Townsend, director of the N. Y. state office of atomic development. Lack of such a publicly declared policy has not only resulted in the selection of a number of site proposals, Mr. Townsend noted, but may also result in definitive policy emerging from the proposed reactor site criteria established by the AEC in May 1959, "without the benefit of exhaustive public discussion and examination."

REACTOR PROJECT ACTIONS by the AEC in recent weeks have included: Issuance of a construction permit for PG&E's Humboldt Bay powerplant; extension to July 15, 1961, of the completion date for D.C.'s Lagoon Beach, Mich., project; decision by AEC's Reactor Safeguards Committee that all safety matters pertinent to the Elk River, Minn., boiling water reactor project to be operated on property of the Rural Cooperative Power Association be satisfactorily resolved to consider whether operation of the AEC-owned plant will be given; scheduling another hearing for mid-December to consider an amendment for the permit application to construct Consumers Power Co.'s proposed Big Rock Point nuclear project, also given a clean bill-of-fairness by the Reactor Safeguards Committee. This committee also considered the hazards associated with the fuel elements of the Pathfinder reactor of Northern States Power Co., recommending further testing by the AEC prior to placing a high power limit on this reactor.

PING COAL COMPETE, the atomic energy program is providing radioisotope techniques, important now potentially, in coal mining, transportation, storage and use. These uses were identified and discussed at a recent conference co-sponsored by the AEC, American Mining Congress and Bituminous Coal Research, Inc.

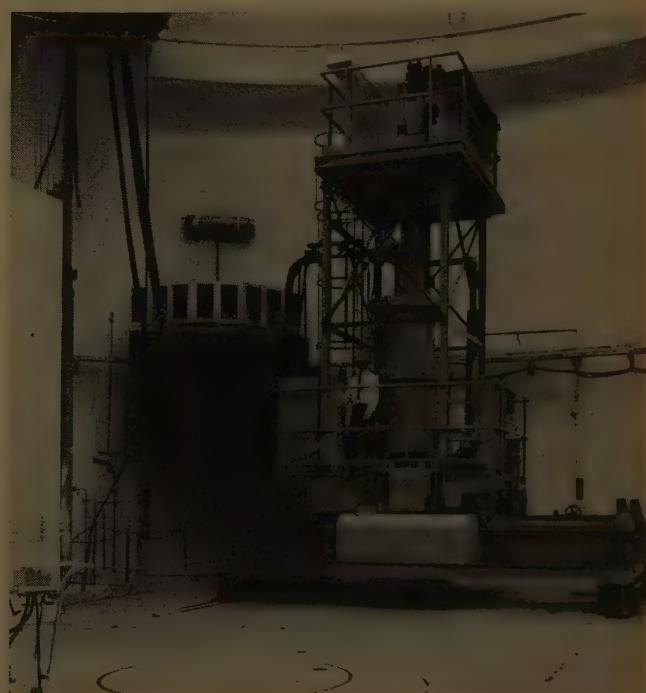
AMOUNTS OF URANIUM CONCENTRATES to be purchased by the U. S. Government through 1966, under the 27 existing contracts with domestic uranium milling companies, and the prices to be paid, have been published in the AEC's 1960 Report to the Congress. In Canada, to keep its sagging uranium mining industry alive, six major mining companies recently set up a \$1,250,000 research program.

CANADIAN NUCLEAR ASSOCIATION, organized a couple of months ago, is now acting as a coordinated voice in presenting the views of its members to governments on all phases of future developments in the peaceful uses of nuclear energy. According to I. F. McRae, the Association's first president, its services are described as similar to those of the Atomic Industrial Forum in the U. S.

AEC'S 11-VOLUME REPORT on the Civilian Power Reactor Program is now complete, with the recent release of Book 8 of Part III—*Status Report on Gas-Cooled Reactors as of 1959* (TID-8518-8), available from U. S. Govt. Prtg. Office, Wash. 25, D. C., for 55-cents.

FORUM'S "WORLD SURVEY," a 160-page illustrated collection of articles on the status and prospects for commercial applications of the atom on a worldwide basis. Nuclear authorities from more than 20 countries cooperated with the AIF staff in producing the book, available for \$3 a copy.

PLUTONIUM RECYCLE TESTING at Hanford, Wash., utilizing the test reactor which achieved initial criticality in November, depends upon this 50-ton fuel element charge-discharge machine for handling loadings under test in various patterns. Reactor core is in the foreground.



HOW EFFECTIVENESS RATING CAN MOTIVATE SALES FOR A NON-MERCHANDISING UTILITY

Better than the quota system of sales evaluation, says California Edison, after a two-year application of a new evaluation method—the SALES EFFECTIVENESS RATING SYSTEM

By V. L. SCOVEL, Economic Analyst, Southern California Edison Company

THE Southern California Edison Company has developed and implemented a sales evaluation system for its district sales organizations which departs radically from methods traditionally employed by this company and the utility industry generally.

This rating system, which is termed RESIDENTIAL SALES EFFECTIVENESS RATING, has been in force for about two years. During this period, it has proved to be an effective means of improving overall performance of the district sales staffs.

The RESIDENTIAL SALES EFFECTIVENESS RATING has four main objectives:

1. To motivate the district sales organizations by comparing their performance and thereby engendering a spirit of competition.
2. To encourage District Sales Managers to think in terms of their overall program rather than to concentrate their efforts on favored projects.
3. To allow departmental managements to guide the activities of the decentralized district sales organizations.
4. To assist each District Sales Manager in the analysis of his operation by delineating areas of strength and weakness in his group's performance.

The rating system is computed quarterly, using year-to-date information. The first three quarterly reports are considered to be preliminary with the final report for the year being computed at the end of the fourth quarter. This evaluation does not attempt to tell the line sales organization whether their

performance is good or bad—it merely relates their effectiveness in each area of their operation to the average for the Company residential sales force as a whole.

The RESIDENTIAL SALES EFFECTIVENESS RATING uses as a benchmark the arithmetic average of the 24 sales organizations in the Company. Each facet of the district sales operation considered is related to the corresponding overall arithmetic average for all districts which has arbitrarily been given a rating of 50.

Each sales organization is rated relative to the sales opportunities existing in its geographic area. Therefore, before relating the districts' performances to the average for the system, it is necessary to adjust the data for differences in sales climate or sales opportunity that are inevitable in the heterogeneous districts comprising the service territory of the Southern California Edison Company. Each facet of the sales operation must be considered separately, since different factors affect each. These differences are statistically removed, as will be illustrated later. The overall evaluation program consists of ratings for the districts in 13 individual areas of operation, with bonuses allowed in two others for compliance with certain administrative obligations. (Table 1) The components of the overall sales operation are assigned weights or values, and are combined into an overall Effectiveness Rating for each district based upon these weights.

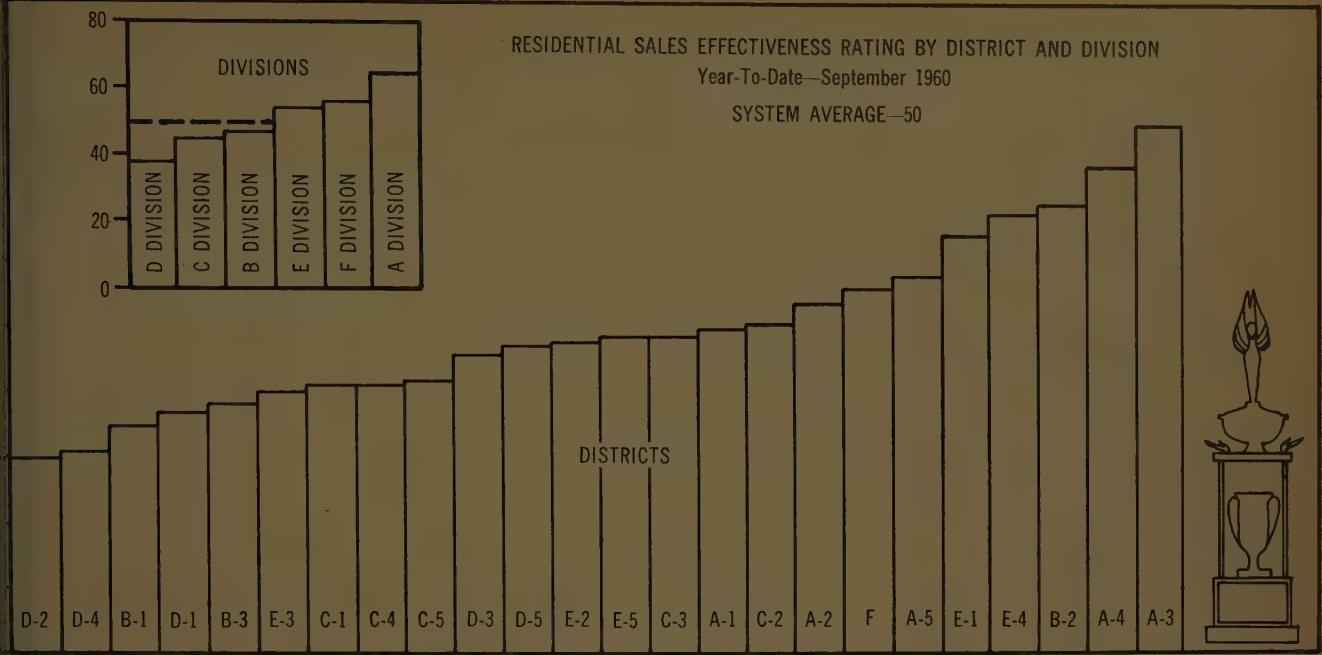
Experience with the RESIDENTIAL SALES EFFECTIVENESS RATING thus far indicates that its

four main objectives have been met with degrees of success varying from good to excellent.

The RESIDENTIAL SALES EFFECTIVENESS RATING has proven to be a productive instrument in motivating sales organization—a difficult task in a non-merchandising utility such as the Southern California Edison Company. There is no question but that the rating device has increased competition among the district sales organizations. This competitive spirit is encouraged by presenting the evaluation in chart form each quarter, with the districts ranked

An incentive to reach new peaks of performance—that is the "President's Trophy" (below) which Southern California Edison Company awards at the end of each year to its most effective district sales team. The utility's President J. K. Horton, left, inspects the award with Vice-President T. M. McDaniel, Jr.





RESIDENTIAL SALES EFFECTIVENESS RATING—YEAR-TO-DATE—SEPTEMBER 1960

e of ponent	MEDALLION HOMES				APP. INST. NEW AND R/W HOMES				HEAT PUMPS				OTHER HEATING				Report		E. R.			
	Connected (a)				Water Dryer Heater Cond.				Signed C'n'ct				Signed C'n'ct				Home Econ.	Living Center	Sales	Time- liness	House Power	Grand Total
	Signed	Tracts	Single	Apart.	Total	Range	Dryer	Heater	Cond.	Signed	C'n'ct	Signed	C'n'ct	Signed	C'n'ct	Signed	C'n'ct	Activ.	Activ.	Exp.		
A-1	60	xx	xx	xx	60	20	10	30	10	40	20	20	27	13	50	50	50	2	35	xx	50	
A-2	42	38	45	33	39	49	52	45	162	56	23	28	23	60	98c	34	100	0	0	54		
A-3	90	0	26	—b	25	49	27	66	9	24	25	162	208	49	57	8	100	0	0	81		
A-4	79	198	50	161	108	69	46	163	157	114	206	22	63	29	—c	34	100	0	0	75		
A-5	87	25	62	49	46	113	117	93	39	171	66	2	28	62	—c	86	100	0	0	58		
VISION	31	56	38	45	51	75	54	120	64	66	135	18	48	37	81	56	100	0	0	64		
B-1	66	63	44	72	54	71	59	97	86	86	91	46	74	47	79	44	100	0	0	35		
B-2	36	29	84	44	46	31	37	21	58	9	6	39	18	41	—c	61	94	0	0	35		
B-3	45	198	47	78	151	50	46	59	1	42	111	84	52	39	59	90	100	0	0	69		
VISION	26	62	36	12	46	24	27	7	18	5	23	29	2	75	—c	96	78	0	0	38		
C-1	36	96	56	45	81	35	37	29	26	19	47	51	24	52	59	82	91	0	0	47		
C-2	74	84	25	14	73	28	41	6	0	23	7	13	8	66	25	47	78	0	0	41		
C-3	83	0	88	0	44	34	50	29	22	43	26	16	90	121	—c	14	94	0	0	51		
C-4	80	14	75	75	54	32	37	22	6	40	19	155	60	35	45	32	89	0	0	49		
C-5	30	—b	107	12	23	49	55	48	179	16	16	70	87	44	56	31	89	0	0	41		
VISION	62	15	27	148	25	24	29	24	7	45	66	124	48	28	27c	49	94	0	0	42		
D-1	66	28	64	50	44	33	42	26	43	33	27	76	59	59	38	35	89	0	0	45		
D-2	40	6	61	17	20	18	16	20	26	37	22	24	17	48	69	63	94	0	0	37		
D-3	32	3	52	54	30	30	60	17	24	21	24	43	12	31	40	34	94	0	0	30		
D-4	49	62	63	12	53	34	37	26	90	133	15	12	5	52	40	31	100	0	0	46		
D-5	33	68	25	0	40	26	35	11	28	17	11	4	13	41	35	62	100	0	0	31		
VISION	60	46	33	58	45	50	65	61	68	24	40	89	53	31	57	29	100	0	0	47		
E-1	43	37	47	28	38	32	43	27	47	46	22	34	20	41	48	44	98	0	0	38		
E-2	31	27	38	34	35	73	75	77	81	86	81	45	43	43	—c	86	89	100	0	0	64	
E-3	18	—b	31	13	16	84	85	81	8	64	68	26	27	32	25c	67	100	100	0	0	48	
E-4	30	12	57	26	34	41	41	24	50	20	87	64	15	46	—c	64	100	0	0	40		
E-5	34	56	38	85	78	126	96	62	23	48	26	59	145	57	—c	63	94	100	0	0	68	
VISION	36	8	40	65	42	40	17	70	47	14	21	39	62	55	49	46	94	100	0	0	49	
VISION	30	26	41	45	41	73	63	63	42	46	57	47	58	47	37	65	95	80	0	0	54	
EM AVER.	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	95	17	50	50	

Represents rating of Medallion units connected in tracts, singles, and apartments weighted by the number of dwelling units connected in each category.

Dash indicates no dwelling units in category connected.

No Living Center, or Living Center inoperative during all or a portion of period.

Effectiveness Rating—

according to their overall rating. (See accompanying Chart.) Half the districts are, of necessity, above the system average, and half are below. The competitive spirit has been further stimulated by the establishment of an award—The President's Trophy—to be given to the district with the highest Effectiveness Rating at the end of each year.

These competitive and motivational aspects of the RESIDENTIAL SALES EFFECTIVENESS RATING cannot help but improve overall performance of the entire sales organization. Since the system average is used as the basis for comparison of the performance of the district sales organizations, the accomplishments of each affect the ratings of all others. The district sales staffs are thus put in much the same position as the Little White Queen in "Alice In Wonderland," who stated that in her peculiar land "... it takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that."

Benefit—All Data in One

Not insignificant among the benefits of this evaluation system is that various data relative to the many facets of the operation of the Residential Sales groups are combined into a single report. This encourages the District Sales Managers to think in terms of the overall program of operation. Further, it readily points up areas which may have been neglected, need special attention and/or may be one of the District Sales Manager's favored projects.

The Effectiveness Rating provides a means whereby departmental management can easily guide the activities of many individual sales organizations. By assigning high values or weights to certain activities, management can insure that maximum effort will be expended on them. These weights can be based on desirability of load, revenue, or any other criteria management wishes to employ. They are flexible and can be altered to coincide with special sales promotional campaigns, to change emphasis of activities, etc. For example, the

EEI-sponsored Housepower Forum became a bonus component of the Effectiveness Rating at mid-year with a relatively high weight. All districts having completed the project receive the bonus, while those not having completed it do not. There are indications that the addition of this component will result in most of the districts having completed this program by the end of the calendar year.

Evidence of the usefulness of this evaluation system in guiding the efforts of the decentralized district sales organizations is provided in other areas. Departmental management had long felt that the Company's Electric Living Centers had not been utilized to the fullest extent possible during the past. Usage of this high-investment sales tool for sales promotional purposes increased over 50-percent from the first 9-months period of 1959 to the comparable period of 1960 without addition in personnel. The conclusion is inescapable that the RESIDENTIAL SALES EFFECTIVENESS RATING, which was in force during this period, was instrumental in stimulating increased usage of Electric Living Centers during the past year.

The Effectiveness Rating has also been used to encourage Home Economists to employ mass-selling techniques rather than concentrating their efforts on the more expensive home-call type of sales promotion. By awarding points on a "per person" basis (with varying allowances being made for the subject of the sales presentation and the type of individual contacted) and basing the Effectiveness Rating of the district on total points earned per man-day, emphasis has been shifted from the home-call program to group sales meetings.

Guide to Sales Manager

The fourth objective of the RESIDENTIAL SALES EFFECTIVENESS RATING, which is to delineate for the Sales Manager his areas of strength and weakness, and assist him in the analysis of his operation, is perhaps most important. Although specific knowledge relative to the extent of the use of the Effectiveness Rating for this purpose is not readily available, there have been indications that the rat-

ing device has been of value in this area.

The derivation of components of the RESIDENTIAL SALES EFFECTIVENESS RATING, of necessity, varies considerably. In the computation of the component, Medallion Homes Signed, in addition to the number of Medallion units signed in each district factors considered are:

1. The number of homes being built—or the volume of housing construction activity;
2. The type of homes being built—whether they are singles, tracts, or apartments, and the subsequent variations in the amount of sales effort required per dwelling unit, and
3. The value of the homes being constructed.

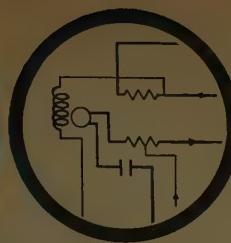
Districts vs. System Average

These differences in district characteristics are statistically eliminated. The overall result listed in this column in the accompanying Table is the sales performance of each district relative to the system average, with the variations in district characteristics statistically removed. For example, District A-1's performance is below average for the system, while District A-4's is about 75-percent above the system average.

Medallion Homes Connected relates completions of Medallion Homes in the three major market areas—tracts, singles and apartments—to the total number of homes completed in these three categories.

Appliances Installed In New and Rewired Homes relates the totals in each category to the number of new homes completed. This is then compared to the existing saturation of these appliances in the districts as determined by an annual sample mail survey. (It is felt that the existing saturation is a measure of each district's sales climate for each appliance.) We can thus determine whether the particular appliance saturation in the district increased or decreased during the period. Here, again, the districts' progress in each area is compared with that for the system as a whole. To illustrate, in the *Range* component, the progress of District A-2 is slightly

(Continued on page 43)



ENGINEERING-OPERATIONS

Analyzes Our Three Main Fuels

A five-year analysis of fuel for electric generation by the electric utility industry has been published by the Electric Institute's Statistical Dept. It reports burned under boilers and by internal combustion engines. Excerpts from the report for the United States include the following:

Average Btu per net kwh have dropped from 11,699 in 1955 to 10,879 in 1959, while average cost per million Btu consumed went from 24.3 cents in 1955, peaking at 27.1 cents in 1957 and settling to 26.1 cents in 1959. Average cost of fuel per net kwh went from 1.3 cents in 1955 through 0.31 cents in 1957, and back to 0.3 cents in 1959.

Gas remained at the highest cost per million Btu in 1959, at 35.0 cents in 1959, while coal followed at 23.2 cents.

Average Btu content of coal has dropped steadily from 12,048 Btu/lb in 1955 to 12,016 Btu/lb in 1959, while its average cost per ton went from \$6.01 in 1955 to a high of \$6.62 in 1957, dropping back to \$6.28 in 1959. Average cost per barrel of oil was \$2.22 in 1959, while its Btu content per gallon at 150,799—up from 1955 value of 150,526 at a cost of \$2.12 per barrel. Its cost rose steadily, however. It went from \$0.188 per thousand cu ft in 1955 to \$0.236 per thousand cu ft in 1959. Its average Btu content per cu ft went from 994 in 1955, dropping to 994 in 1957, and rising again to 107 Btu/cu ft in 1959.

Finds Line Patrol Cheaper By Chopper

Central Maine Power and Rangeley Power recently began to patrol their more than 1700 miles of transmission lines by helicopter. They can now patrol faster by air than by foot.

Previously CMP used 13 men on foot to patrol. Depending on local ground conditions they averaged eight to ten miles per day. Together they covered 170 miles each month.

In the new method, a routine flight will be made monthly. Helicopter patrol is expected to take 13 days to complete. During the year, crews will also make one careful ground inspection of the system.

CMP's transmission lines are numbered on every structure so that faults can be located by air. Of 1750 miles of line, some 676 are 115 kv. Most of the rest of the system is 34.5 kv.

Highly 3750 structures will be numbered with white on black numerals. On the wooden structures,

numbers will be placed on the sides of crossarms, and on towers the numbers will be on the tower frame near the top.

Appalachian Uses Dual Purpose Line Truck

A dual purpose line truck has been put into service in the Abingdon district of Appalachian Power. It will be used for pole setting and maintenance work on poles and lines. It has an overhead extendable boom with an insulated bucket controllable from the bucket.

The boom itself can be moved 360 degrees and has a 22-ft reach. It can be elevated to a 95 degree angle or lowered to 25 degrees below the horizontal, putting its head only two ft from the ground. The boom is made up of a 14-ft solid section and an 8-ft extendable section.

Advantages of the truck are numerous. It is easier on personnel and more efficient, according to Appalachian. To position men and material, all that has to be done is move the boom. Pitman Mfg. Co. designed and built the working equipment, and Baker Equipment Engineering Co. built the body.

Meanwhile, Boston Edison is trying out a short-length cable splicer's cart. Latest and smallest of the company's road vehicles, it carries splicers' tools and safety equipment, fire extinguisher, rubber blanket, rubber gloves, gas tester, propane tanks, etc.—720 lbs of equipment in all.

Designed to cope with traffic conditions, and when men are detailed on extended assignments, the cart is only 75½ in. long, and 48 in. wide. Thus it will not obstruct a traffic lane, and when parked curbside, even where closely parked cars leave little room for a truck, space normally can be found.

400-kv Reactors Help Long Lines

An advanced way of supplying inductive impedimentances to long high-voltage lines in Sweden is being planned. Direct compensation of the very high-voltage lines (to correct the effect of capacity) will be done with 400-kv shunt reactors. This method will allow the line transformers to handle a larger active power than was possible when inductances were added to a low voltage tertiary winding.

The three-phase force-cooled 400-kv reactors will handle 150 mvar, and have an insulation level of 1,500 kv max. 1/50 microsecond full impulse wave. They weigh 180 tons each and will be installed at Hallsberg transformer station.



Urban development adjacent to a 250-ft right-of-way strip purchased in fee in 1932. Note that there were no encroachments when second line was built in 1958.

HOW PEPCO SOLVES RIGHT-OF-WAY ACQUISITION PROBLEMS IN URBAN AREAS

By R. L. BORTNER, Manager, Real Estate Department, Potomac Electric Power Company

You get more for your money when you buy the fee title. There is no difference between the cost of a fee and the cost of an easement.

BASED on recent experience in buying right of way in the Washington, D. C. Metropolitan Area, the Potomac Electric Power Company has solved its urban area acquisition problems by following these general rules:

1. Plan and buy rights of way and substation sites far in advance for future use.
2. Always buy the fee title instead of an easement.
3. Select substation sites that will permit good screening.
4. Don't hesitate to purchase excess land.
5. Employ mature, well-trained

right-of-way agents.

6. Support right-of-way agents with the very best of legal advice and appraisal data.

Definition

An urban area means an area in which open land is being held for residential or other types of development; where land prices are in excess of \$1,000 per acre; where subdividers are demanding roads, water lines and sewer lines; where governmental agencies are either providing or planning to provide parks, roads, water and sewer facilities, and, last but not least, where

Editor's Note—This article has been adapted from a paper presented at the Engineering and Operation Section Meeting of the Southeastern Electric Exchange held in New Orleans.

and owners and the planners want any high tension lines or substations. Usually it is also an area which has been completely cleared and in many cases without permission for the construction of electric facilities.

In 1956, PEPCo started a major expansion program which has already involved the purchase of nearly 24 miles of 250-ft right-of-way in urban areas and which now involves acquiring an additional mile of about 20 miles.

Company Organization

PEPCo both Engineering and Estate report directly to the Vice President, and recommendations are recommended by Engineering and approved by Management. Our Real Estate Department has a free hand to proceed with land substation location studies. Results of these studies are discussed with Engineering and, where in agreement, Management authorizes the necessary funds available for land purchases. This cooperation has resulted in the Real Estate Department being able to acquire land to meet all scheduled construction dates and in buying which, in some cases, will not be completed until 1964.

Advance Planning Necessary

In an urban area, advance planning and buying are necessary if substations, supplied by high tension overhead lines, are to be located close to load centers and not near the perimeter of the urban area. For example, our Bells Mill Substation, put in service in 1959 is located only 5½ miles northwest of the District of Columbia boundary. The District of Columbia boundary is supplied by two single-circuit, 230-kv tap lines on one right-of-way purchased in 1958. The tap line right-of-way is 11 miles long and the cost, at overhead, was nearly \$72,000 per mile, or an average of \$2,400 per acre for land in the right-of-way.

A fair estimate of the cost of one right-of-way today would be about \$100,000 per mile due to subdivisions and other types of development. Another example is the proposed Oak Grove Substation located six miles southeast of the District of Columbia boundary. The station will not be developed before 1962 and will ultimately be the interconnection point of 12

230-kv circuits located upon three separate rights of way. When we purchased this 75-acre site in 1958 we paid \$650 per acre for the land. Today, land within ½ mile of the station has sold in bulk for \$1,800 per acre and prices are still going up.

How Far Ahead?

Advance buying frequently involves condemnation and I have been asked many times just how far ahead of construction the Courts will permit such taking. For obvious reasons I cannot give a specific answer but in Maryland we rely upon the case of the State Roads Commission vs. Franklin, which turned about the right of the State to condemn for a second lane of a dual highway when only one lane was to be constructed at the time of the taking. The Court of Appeals of Maryland in its opinion gave recognition to the possibility that "the construction of this 'expressway' to be completed in the distant future will inflict hardships upon many

individuals" but went on to say "In determining whether the taking of property is necessary for public use not only the present demands of the public, but those which may be fairly anticipated in the future, may be considered." Thus, if we have a definite and logical plan for future development, we can proceed with land acquisition many years in advance of construction.

Form of Taking

The form of taking is particularly important when buying right-of-way for future use. We buy a qualified fee title and reserve to the property owner the right to use the strip for agricultural purposes but without liability on our part for any damage to crops or gardens. We have found that when we own the land our property lines are respected, but when we have easements we are constantly bothered by encroachments, by limitations upon our right to add to our facilities from time to time or to change the form of use, and by loss of title

Aerial view of Bells Mill Substation, about 5½ miles northwest of District of Columbia boundary, shows screen of woods on all sides except where it was necessary to clear rights of way for overhead lines. Note the 250-ft right-of-way strip through an urban area.





Without notice to PEPCO, this developer constructed streets which reduced the width of an easement right of way from 110 ft to approximately 18 ft. Note that houses face the right of way.



Sand and gravel removal from an easement right of way will necessitate grading and reconstruction of this 69-kv transmission line.



Encroachments upon an easement right of way purchased in 1941, interfere with patrol and maintenance.

by tax sale. To illustrate the relative advantages of the fee taking and the disadvantages of the easement, here are a few examples.

In 1932 we purchased in fee 250-ft right of way and constructed upon it one single-circuit 230-kv line (see photo). In 1958, 26 years later, when we built the second 230-kv single-circuit line, we found no encroachments and our construction progressed without interference of any kind. On another 250-ft strip purchased in fee in 1932 for two 230-kv single-circuit towers, we now have, in addition, two 33-kv pole lines and no questions were ever raised as to our right to build them in 1959 and 1960. As opposed to this, we have one section of easement right of way, purchased in 1941 (see photo), that is so cluttered up with fences, tool sheds, garages, fireplaces and other housing adjuncts that we may be forced into some 40 or more law suits to try to protect our rights. This situation was brought about by the subdivider telling lot purchasers that they owned the underlying fee title. That happened to be true because he ran his lot lines down the center of the right of way.

Fee Title Best

I could cite many more examples of the disadvantages of the easement but to save time I'll simply say that you get more for your money when you buy the fee title and that, in an urban area, there is no difference between the cost of a fee and the cost of an easement.

It is, of course, obvious that locating a line in an urban area requires detailed study in order to get the proper balance between estimated construction costs and estimated land costs. To reduce construction costs it is sometimes advisable to put the line in partially developed areas and to pay the price for land. On our line between Dickerson and Burtonsville, Maryland, we purchased and tore down four dwelling houses and, in one case, paid \$22,500 for a house and four acres of land in order to acquire 583 ft of centerline. The cost of such purchases was more than offset by the reduction in the length of the line and the elimination of heavy angles.

When planning a major substitution in a rapidly developing area,

is consideration should be to a site that will permit good thing. In connection with our Mill Substation we needed 30 acres of land for the installation and protection of our equipment, but we purchased 69 at \$3,000 per acre so that we maintain a screen of woods on both sides of the station except where it was necessary to clear a way for overhead lines (photo). Although a few landowners in the vicinity objected to the erection of a large station in a residential area we believe the screening was effective in preventing organized opposition to our plan and the station went into operation on schedule.

Dedicate Right of Way

When we laid out one of our lines through Montgomery County, Maryland, officials of the controlling planning body in our Washington metropolitan area indicated that a right-of-way strip extending from the northwest corner of the property to the southeast corner would seriously interfere with the future development of highways and streets, and we were accused of trying to erect a "Chinese Wall." To overcome this objection, we filed with the planning body a letter in which we agreed that, when any new highway or street required all necessary approvals from interested governmental agencies, we would dedicate, without charge, a right of way through our property.

The offer to dedicate carried with it a number of conditions, the most important being: (1) the right-of-way should be approximately 80 feet wide; (2) the right angles to our centerline; the edge of the highway or street should be at least 25 ft from any structure; (3) the grade of the right-of-way should be such that necessary clearances would be maintained; (4) that our Company would not be put to any expense in saving; and (5) that no bad title conditions would be created. A properly drawn offer of this nature is not only reasonable but it is to all parties concerned in the general public.

Excess Land

When working upon right-of-way purchases in an urban area, we do not hesitate to purchase excess

land. Our experience indicates that in many cases substantial amounts of money can be saved by purchasing an entire tract and salvaging the excess. As a case in point, in Montgomery County, Maryland, our line ran diagonally through a rectangular tract of 54 acres and left two triangular parcels, one on each side of the right of way, containing 22 and 21 acres respectively. Our appraisers had appraised the 11-acre strip and damages at \$21,000; the property owners had held out for \$30,000 and our trial attorney was of the opinion that a condemnation jury could easily give a verdict in excess of \$30,000. We paid \$73,000 for the entire tract in 1958 and have recovered more than \$26,000 from the sale of the 22-acre parcel in 1959 and more than \$28,000 from the sale of the 21-acre parcel in 1960 which makes our 250-ft right-of-way strip cost about \$19,000. Another example is our purchase, in 1958, of a tract containing 21 acres in order to get a six-acre right-of-way strip. Although we can sell the excess land for more than we paid for it, recent studies have shown that the 15-acre parcel will make an ideal site for a future 230-kv to 69-kv substation and our total investment is much less than the present market value of the land.

Zoning

In our area, we have what amounts to county-wide zoning and, with some exceptions, the construction of steel tower transmission lines and substations is not a permitted use under the zoning regulations. We try to keep the proper authorities informed as to our plans but, in many areas, we must apply for and get zoning exceptions for all construction except pole lines and distribution facilities. At the present time we do not anticipate any serious difficulties in getting our zoning approvals but I suggest that, if your semi-urban areas are not completely zoned, try to have future zoning regulations recognize the necessity for building heavy lines and substations.

The effect of the Federal tax situation upon negotiations and prices is also important. In areas where land prices have gone up rapidly within a few years, and are still rising, income tax, even on a capital gains basis, becomes a problem to

the land owner when his cost base is low. Although a land owner may consider an offer to be fair and reasonable, we are often asked to increase our price to partially offset the income tax and, usually, the end result is either an increased offer or a condemnation suit.

To some extent this problem has been solved by pointing out to the property owner the fact that, since our taking is under the threat of eminent domain proceedings, the sale to us is an involuntary conversion and no tax payment is required if the proceeds are reinvested in real estate within the time fixed by the Internal Revenue Code. Also, upon request, we will furnish a property owner with a division of the total price into the elements of land value and damages. This has also helped the situation since no tax is payable upon the portion allocated to damages. In some cases, in order to hold down tax rates, property owners request purchase price payments on the basis of 30 percent at the time of settlement and the balance in equal installments, with interest, over a period of years. We have followed this plan in several instances but we do not recommend it because of record keeping and other problems.

Good Legal Counsel

Most landowners have the judgment and the resources to employ competent legal counsel and appraisers. This makes it essential to employ as right-of-way agents, mature, well-trained people who will not be at a disadvantage when negotiating with a wealthy landowner and his able advisers; it is also essential that the agents shall be supported by equally good or perhaps better legal advice and appraisal data. When condemnation becomes necessary we have found that, in addition to our own capable legal staff, the employment of competent associate counsel, able appraisers, and outstanding expert witnesses pays dividends. Between 1957 and 1959, in 277 separate acquisitions, although some of them were not in an urban area, we settled 272 cases without litigation; in five condemnation cases that went to trial, verdicts were less than our offers in four cases and in the other case the verdict exceeded our offer only by the amount of \$2,500.

DIGITAL COMPUTER PROGRAMS

SPEED SHORT CIRCUIT STUDIES

System growth makes it necessary to use both analog analyzers and digital computer programs.

Successful fault studies have resulted.

By HOMER E. BROWN, Staff Engineer,
GEORGE L. LANDGREN, Staff Engineer,
and WILLIAM M. THORN, Engineer,
Commonwealth Edison Company

EXPERIENCE with digital computer fault study programs supplemented by existing a-c and d-c calculating boards at Edison has been very satisfactory. Success in solution of fault problems has been due to the computer's advantages of economy, accuracy, reduction of human errors and availability for re-runs.

Cooperative effort with General Electric and American Electric Power since late 1958 included tests of two programs designed to compute three-phase faults on transmission systems. One program used the iterative approach that has proved so successful in power flow work. The other was based upon the Z-matrix or driving point and transfer impedance matrix. Tests on C. E. and A. E. P. systems showed that the matrix method had the obvious advantage that re-runs with slight system changes could be accomplished with very little increase in machine time.

The most efficient method (highest speed) of forming the impedance (Z) matrix was then sought. Edison did the actual programming as its part in the cooperative effort.

Program Requirements

Considered essential was fault information now being provided through analog solution using the ASA-AIEE simplified method of fault-current calculation. See Table I. These essential data are required for a variety of conditions which include:

1. Various generator conditions from maximum to minimum generation available.

2. Various transmission system conditions from the normal in which all lines are in service to special conditions during sequential clearing of faults by protective equipment.

3. Total fault on each bus with each line from the faulted bus opened one at a time.

Because of the computer's volume potential, additional data and refinements in the calculation method not currently calculated on a regular basis were also indicated as desirable if they could be eco-

nomically included in a computer program. These include:

1. Developing positive and zero sequence equivalents between selected points.

2. Processing conditions with two or more simultaneous faults at specified locations involving different phases.

3. Using complex impedance quantities in lieu of simple Z or Δ .

4. Adding connected loads to the system.

Some compromise was necessary, however, in the interest of providing a fast, flexible program.

A basic compromise accepted was the use of simple rather than complex reactance or impedance quantities. Previous experience with the analog solution suggested that, for most systems, complex quantities are not required for satisfactory accuracy. This was confirmed by use of a fault program for the IBM 705 Computer which Edison has written based on the network reduction principle. Where X/R ratios for various system points are desired, they can be obtained through the use of the 705 program.

The following approach to what output data could be reasonably provided was agreed upon by all interested departments.

1. Input data should be generally prepared from a system diagram. However, modification of the input system data for one study might be used for a later study if the system additions could be handled by a simple procedure.

2. The basic output data would generally include:

(a) Total fault for each bus in the complete system.

(b) Total bus faults with one line open at a time from the faulted bus.*

(c) "Line end faults."*

(d) Contributions in each line connected to the faulted bus for "a," "b" and "c."

(e) Voltages at all adjacent buses.*

3. Optional output data should be the individual line currents in all preselected lines.

4. An optional feature should be

* Can be omitted if desired.

Editor's Note—This article was adapted from a paper presented by the authors to the American Power Conference, March, 1960.

FAULT STUDY OF WEST ZONE 34.5KV COMMONWEALTH EDISON CO.

1959

3Φ FAULT STUDY

BUS	TOTAL FAULT	FAULT CONTRIBUTION FROM BUS		
	GEN.	2	10	
1	2159.74	1986.8	89.4	83.6
LINE OPEN AT BUS 10				
2078.02	1986.8	91.3	.0	
LINE END FAULT				
89.17	85.3	3.9	.0	
LINE OPEN AT BUS 2				
2072.30	1986.8	.0	85.5	
LINE END FAULT				
119.30	114.4	.0	4.9	
BUS	TOTAL FAULT	FAULT CONTRIBUTION FROM BUS		
	1	GEN.	3	
2	446.19	118.9	102.7	224.6
LINE OPEN AT BUS 3				
222.03	119.3	102.7	.0	
LINE END FAULT				
127.06	68.3	58.8	.0	
LINE OPEN AT BUS 1				
327.70	.0	102.7	225.0	
LINE END FAULT				
91.31	.0	28.6	62.7	
TOTAL FAULT				

FAULT CONTRIBUTION

One print-out for the three-phase fault study program, note that total fault is 2159.74 mva with contributions of 1986.8, 89.4, from the generator, bus 2 and bus 10 respectively. Farther down is corresponding data for "line open" and "line end" faults. Voltages at adjacent buses were not elected to be printed this particular study.

Interpretation of phase-to-ground data is similar to that for Fig. 1 except that "GRD" indicates a zero sequence source,

e.g., generator or transformer, and only the lines providing zero sequence contributions are listed. The "EZ" line indicates that the zero sequence voltage at the faulted bus is 0.2886 per unit and the zero sequence voltages at the adjacent buses are 0.0, 0.2489, and 0.0 for the ground source, bus 2 and bus 6, respectively. Corresponding data is shown for "line open" and "line end" faults. Fault mva values indicated are equivalent three-phase, i.e., the faulted phase amperes times the square root of 3 times nominal phase-to-phase voltage.

CECO 7-BUS SAMPLE NET WORK 8-18-59 SINGLE PHASE STUDY

1959

1Φ FAULT STUDY

BUS	TOTAL FAULT	ZERO SEQUENCE FAULT CONTRIBUTION FROM BUS		
	GRD.	2	6	
1	119.34			
ZERO SEQUENCE AMP.	36.1	3.7	.0	
PHASE CURRENT MVA.	107.2	10.8	1.3	
EZ .2886 VOLTS	.0000	.2489	.0000	
LINE OPEN AT BUS 6				
118.14				
ZERO SEQUENCE AMP.	35.7	3.7	.0	
PHASE CURRENT MVA.	107.1	11.0	.0	
EZ .2857 VOLTS	.0000	.2464	.0000	
LINE END FAULT				
7.93				
ZERO SEQUENCE AMP.	2.4	.2	.0	
PHASE CURRENT MVA.	7.2	.7	.0	
EZ .2857 VOLTS				
LINE OPEN AT BUS 2				
108.74				
ZERO SEQUENCE AMP.	36.2	.0	.0	
PHASE CURRENT MVA.	107.2		1.5	
EZ .2900 VOLTS				

TABLE I

**Essential Output Data to be Provided by
Computer Program for Fault Calculations**

- A. Three-phase faults at every bus.
 - 1. Total fault in amperes or Mva.
 - 2. Immediate contributions in amperes or Mva.
 - 3. Voltages at adjacent buses.
 - 4. Fault currents flowing in any specified line.

- B. Single phase-to-ground faults at every bus.
 - 1. Total fault in amperes or Mva.
 - 2. Immediate residual (zero sequence) contributions in amperes.
 - 3. E_0 at the faulted and adjacent buses.
 - 4. Immediate contributions in amperes or Mva in the faulted phase.

- C. Line end three-phase and single-phase-to-ground faults. Line end faults (sometimes referred to as detached adjacent faults) are here defined as faults located at the line side of the open breaker at the remote end of a line from the bus under consideration. They are detached adjacent faults if reviewed from the remote bus. The same output data as in A and B above shall be provided for this condition. In this case the adjacent bus is the bus supplying the faulted line.

- D. The same fault data indicated in B above including the effect of mutual reactances of coupled lines.

provided to reduce the basic output to include only the data given in "2" above for a selected list of buses.

5. Optional use to cover alternate system conditions such as the addition or removal of lines and closing or opening of bus ties should be possible for any preselected number of conditions.

6. Calculations of system equivalents should be by an auxiliary program.

The three-phase fault program was developed first. Later the phase-to-ground program was completed. Following are some general aspects of the program's calculations procedure, and how it is used by Edison.

Three-Phase Fault Program

Principal advantages of the three-phase program are its speed and flexibility. This speed is achieved by synthesizing the system one line at a time and eliminating the loops as soon as they are encountered, thereby eliminating the necessity of resorting to tape storage. A 100-bus system never exceeds a 100 by 100 matrix. Thus this size system can be stored in core storage on an 8K computer.

For example, an Edison system of 82 buses resulted in a 137 by 137 matrix before reduction. In the original General Electric program, it was necessary to resort to tape storage with the result that a complete solution required one half hour of machine time. In contrast, the same system required two minutes of machine time when the matrix was formed one line at a time and retained in the core.

This program was assembled for the IBM 704 with either the 8K or 32K core storage. The problem size that can be handled is 100 buses and 250 lines or 220 buses and 750 lines, respectively.

Input data to the program includes: (1) Identification and electrical parameters for lines, transformers, generators, and other equipment; (2) Instructions regarding special output data desired; and, (3) Miscellaneous information such as identification of study, per unit, base, etc.

The equipment data must be presented in a definite sequence, i.e., lines, etc., must be added working away from generator buses. Lines and other equipment are identified by identification numbers of the buses to which they are connected.

Preparation of data for a fault study at Edison usually starts with a system diagram. All buses, junctions of three or more lines or other locations where a fault value is desired are assigned, an identification number between 1 and 999. All generators or sources are assigned the number zero.

The fault program faults the buses in the order presented in the line input data. Judicious numbering of the buses will result in the output being in proper sequence by bus number. Experience has shown that it is best accomplished by assigning bus numbers as the input data is prepared. If the order presented is not in numerical sequence, a list showing the actual sequence in which the buses are faulted can be printed out to facilitate location of fault data for specific buses.

Fault data for a variety of conditions is usually desired. This requires adding or removing lines by the digital program. Removal of a line is accomplished by adding a line with a parameter of opposite sign parameter in parallel with the line to be removed.

Two buses are tied by adding a fictitious bus between them and connecting it to one of the buses by a line with positive parameter and to the other bus by a line with negative parameter of the same magnitude. Changes such as these would usually be made after the program has run its course of faulting all buses on the normal system. The actual line changes are printed in the output and a title may be inserted to describe the changes or new system conditions. It is usually not necessary to fault every bus on the system again; consequently, instructions can be added to fault only specified buses. A sample output for the three-phase fault study program is shown in Fig. 1.

Single-Phase Fault Program

The single-phase program was assembled using the ASA-AIEE simplified method of calculation. The program determines two matrices, one represents the positive sequence network and the second represents the zero sequence network. By suitable algebra the fault data is computed.

This program was assembled on for the 32K computer and has capability of handling a system

uses and 500 lines in each of 10 matrices. Input data required is essentially the same as the phase program except for the final zero sequence data. Open- or mutually-coupled lines require special data preparation; from this, all automatic features discussed in the three-phase program can be used. Output data is phase-to-ground program is in Fig. 2.

Auxiliary Program for Equivalents

ough both computer programs can handle large systems (220 buses for three-phase and phase programs respectively) can cover a major portion of Edison's transmission system, occurring where extensive network through the subtransmission should be included. The programs are not capable of handling combined systems; therefore, to increase program usefulness, an auxiliary program that would determine small equivalents to represent portions of a large system was written. The equivalent can be determined for any number of terminal buses less than

an auxiliary program uses the input as the fault program, its output is in the correct form for input to the fault pro-

Experience With New Program

of the computer fault programs generally fall into two categories: future system studies for planning purposes and present (or future) studies for relay setting purposes.

When Edison's a-c board is used to supplement digital computer power flow studies, the most logical practice is to determine primary fault data for the system. The time power flow studies require generation and transmission conditions are made when many alternative plans are under consideration. When the best plan has been determined, a more detailed computer fault study of the system is made.

Principal consideration in selecting which of the computing tools is used are:

Whether the a-c board is already set up for a power flow study.

2. The amount and accuracy of the fault data required, for example, long-range planning requires less accuracy and less detail than short-range planning or relay application.

Edison's Protective Relay Settings Sections' d-c network analyzer is normally set up for the positive sequence 138-kv transmission system. Additional semi-permanent boards have been made, representing 69-kv and 34.5-kv portions of the system. These are tied directly to the main analyzer. This analyzer is still the main "tool" used for fault studies for relay setting purposes because of its availability.

Since this board is subject to errors caused by poor contacts, digital fault studies have been used as a check on the analyzer's results. The computer data is also used as a readily available source of fault data when normal or near normal conditions are required.

Experience has shown that the method of conducting a digital fault study must be different than that normally used for an analyzer study. The significant cases must be carefully thought out and planned ahead of time in contrast to the method of "feeling your way" through a study when using a board that is always available. Actually being forced to plan a study more completely ahead of time can be a fringe benefit since the engineers must critically look at their past practices from the perspective of a highly organized and detailed approach.

After the program was developed, an addition was made to provide data needed to calculate an equivalent "Y" source representing the entire system viewed from the two terminals of any line. This is useful in calculating fault data for locations between the line terminals. Very frequently such fault data is desired for locations that cannot be anticipated when the fault study is made, e.g., new line taps for customer load or detailed investigation of actual faults experienced. The additional data required is the three-phase fault value with the two line terminals shorted. Using this value and the fault value at each line terminal with the line in question open (obtained from the basic printout) an

equivalent "Y" source to the two-line terminals is easily calculated.

Recent interest in X/R ratios for breaker application makes an a-c three-phase program more desirable than seemed apparent at the time this program was written. Now that a fast method of calculation for the d-c type of study has been developed, it is believed that an a-c fault program can be successfully developed with satisfactory running time. Consideration is now being given to determine whether this reprogramming is justified.

More Advantages

Where a large quantity of fault data is required, Edison has found the digital computer to be more economical than the analog analyzer. While a rigorous comparison of analog vs. digital computer fault studies is rather impractical because of varying conditions between companies, an indication of relative economics is given by a comparison of computer time cost with analog analyzer operating and reading cost. Experience shows that fewer engineering and clerical manhours are required for preparation of a computer fault study than an analog study. For an 82-bus system with 137 lines, the output data representing 356 conditions required two minutes of 704 computer time at a cost of about seven dollars. Cost of manhours alone to read out the data using Edison's analog analyzers is estimated to be 15 to 20 times greater.

One disadvantage which has been accepted with analog solutions is the need to compromise accuracy in setting up problems covering several voltage levels simultaneously. This compromise is not necessary with a digital solution.

The availability of re-runs using the computer solution is believed to be a very important advantage. It is usually impractical to repeat an analog study for a few additional cases when resetting the board is required. Using a computer solution, a data deck is immediately available for additional cases. The deck will remain error free for any subsequent studies desired and will not be subject to poor contact difficulties encountered in boards which are normally set up for one condition.



Test Instrumentation Van Seeks Transient Phenomena Answers

By ROBERT HARNER
Laboratory Supervising Engineer
S & C Electric Company

A test instrumentation van is in the field carrying equipment for high-voltage transient phenomena study. The \$50,000 unit, made available to the industry by S&C Electric Co., carries equipment formerly limited to permanent indoor laboratories. The equipment has been made mobile while retaining all its inherent accuracy.

Many operating problems faced by electric utilities in switching and fusing high-voltage circuits are rooted in phenomena that have yet to be fully understood. Particularly elusive has been a real understanding of the transient recovery voltages that develop during interruption of a high-voltage circuit. Until very recently, not much has been known about how fast these recovery voltages rise in relation to the increase of dielectric strength across the separating contacts.

Need has been recognized for a field laboratory to determine the frequencies, wave shapes, and magnitudes of actual transient switching voltages. Recovery voltages developed under actual operating conditions in the field have not been fully explored. The new van is expected to reveal new understandings of these voltages.

The van has a 14-channel magnetic oscillograph, a 30-channel automatic program timer, a four-channel cathode-ray oscilloscope, a double-wall solid-sheet shielded enclosure, differential d-c amplifiers for capacitance-voltage-divider recording, movie cameras with speeds up to 6000 frames per second, public address systems, floodlights, workshop and a complete photo lab with automatic developing.

Synchronize Electric and Mechanical Data

The equipment array permits synchronized study of electrical and mechanical events that occur during switching and fuse operation. For example, mechanical travel of contacts can be recorded on a common time scale with corresponding interrupted current and recovery voltage. Volume of fuse exhaust gases can be observed on movie film synchronized with oscillograph records.

The automatic program timer permits setting up a complete test sequence in relative calm and leisure. With the push of a single button, the operation to be observed is automatically initiated, carried out and completed. Accessory controls trigger recording mechanisms just a few microseconds before a current zero, which is the start of the critical interval in switching phenomena.

The cathode-ray oscilloscope recording apparatus can stretch a single 60-cps cycle to a length of two

ft on four simultaneous channels. Film records are developed immediately in the van.

Accuracy of the test data available with the van is expected to exceed anything previously available from the field. The double-wall solid-sheet shielded room is electrically insulated from the van to reject all stray signals. The capacitance voltage divider and d-c amplifiers replace potential transformers, eliminating damping and other inductive effects.

The cathode-ray oscilloscope gives flat response to 100 kc via amplifiers and a much higher response by direct feed to the deflecting plates. Four signals can be put on the oscilloscopes simultaneously without cross talk. The companion recording camera offers three recording options: (1) stationary film using the oscilloscope horizontal sweep for a time base, (2) rotating-drum film synchronized with the oscilloscope through external timing controls, and (3) a slow-speed continuous film for long-time phenomena.

Power for the van can come from a self-contained 10-kw, 115-v a-c gasoline-engine driven generator or from an external 115-v a-c source. A 30-amp, 115-v d-c supply is available, too.



Seeking characteristics of actual transient switching voltages, S&C's test instrumentation van brings the laboratory to the specimen.



Function selector is but part of the highly sophisticated equipment which is designed to help engineers understand transient recovery voltages.

Automatic Telephone Dialing Assists Repair Crew Dispatch

Automatic telephone dialing plays a major role getting repair crews out in a recent Florida hurricane, according to E. O. Dunnam,

assistant distribution supervisor for Florida Power and Light.

He credited Dialaphone, a one-touch automatic telephone dialing



E. O. Dunnam uses three basic tools in his dispatching operation—the telephone, its companion Dialaphone, and a microphone for radio communication.

instrument with enabling him to contact repair crews in a hurry. The unit dialed each call automatically while he performed other duties.

The unit's electro-mechanical memory—which can accommodate up to 850 names and numbers enables Mr. Dunnam to call repairmen out in about half the time it took before the unit was installed.

The self-contained unit is placed alongside and connected to the telephone. Its memory consists of a Mylar plastic directory tape on which names and numbers can be listed. Each number is recorded by means of coded perforations. Although the initial directory list is prepared at the factory, each instrument is equipped with a perforator to enable the user to enter new numbers conveniently. The unit is made by Dialaphone of San Mateo, California.

Effectiveness Rating

Continued from page 32)

that for the system, while District A-4 is over twice the service areas as a whole. The remainder of the components computed along similar lines. Names or headings are self-explanatory. The Reporting Timeliness component is perhaps the most important to this. This indicates whether the District Sales Manager is regular monthly reports in the prescribed time. This is a component which has a very heavy weight (2). It, therefore, can affect the overall rating; it has a material influence in encouraging timely reporting, however.

Effectiveness Rating for each component is applied as a percentage of the value of the component to secure a total point value for the district. To secure the overall total points carried by each district is divided by total points in the rating system. In most districts, this is 477; in districts not having Living centers, it is 427.

By experience with the RESIDENTIAL SALES EFFECTIVENESS RATING indicates that it has numerous advantages over the old system of sales evaluation. Areas of volatile growth such as

Southern California, this is especially true. Here, quotas particularly for small areas, all too frequently become quite meaningless soon after being developed.

The RESIDENTIAL SALES EFFECTIVENESS RATING is still in its developmental state. It is felt that in certain areas inequities in the evaluation may still be present. As more experience is gained with this evaluation procedure, refinements will undoubtedly be made. Certainly components will be added to the RESIDENTIAL SALES EFFECTIVENESS RATING as more information relative to sales operation becomes available or the need for emphasis on special programs is apparent. Further, as with any rating device, it will be periodically scrutinized to determine if it is continuing to fulfill satisfactorily its functions of motivation, evaluation and direction of the district residential sales organizations.

Although this rating system has been designed to fit the residential sales activities of an electric utility, this type of procedure for evaluating and stimulating performance is applicable to any business where several groups are engaged in similar-type work. The Southern California Edison Company has developed a rating device based upon this same principle—performance

relative to opportunity—for the Commercial-Industrial segment of the sales organization. This sales evaluation will consider new load added *only* where there is evidence of actual sales effort expended. A component, with an appropriate weight or value, will be established for each of selected areas of Commercial-Industrial load. It will, of course, be necessary to adjust these data for the growth rate of each district.

Special emphasis will be placed upon remodeling of existing facilities which results in new electrical load and upon electrical load which replaces competitive energy sources. The district sales organizations will be encouraged to employ group selling techniques by the inclusion of a component based upon such activities as "Coffee Break Conferences," restaurant open houses, and presentations before trade associations and service clubs. The Commercial-Industrial Sales EFFECTIVENESS RATING will be put into operation on a test basis in approximately one-fifth of the service area this month. When it becomes evident the EFFECTIVENESS RATING is an adequate evaluation of the performance of the sales groups relative to their opportunities, it will be extended to the entire service territory.



EEI Safety Conference: New Resuscitation Methods, Constant Use Of Protective Equipment Stressed

For the 70th time since 1934 the EEI Accident Prevention Committee met, recently . . . and among the 187 delegates and guests gathered in Buffalo there was considerable evidence of renewed dedication to their objective: "Safety . . . Everywhere, All the Time."

Under the direction of Committee Chairman Arthur J. Naquin, of New Orleans P.S., Inc., the group of safety specialists from utilities throughout the nation aimed at implementing "an honest concern with the safety welfare of every employee both on and off the job." Mr. Naquin noted in an introductory message to the conferees that the real safety problems lie ahead. He referred to the fact that the hazards scene has changed many times since 1934:

"Prime movers have been built to operate at ever higher temperatures and pressures. Atomic-fired boilers are now a reality. The electric energy generated is being transmitted and distributed at ever higher voltages and current densities. Motor

vehicle traffic friction has multiplied a thousand-fold."

The group was assured by the president of the National Safety Council, Howard Pyle, that the safety efforts of the electric utility industry were considered among the most effective in all of industry.

Through numerous subcommittee reports, good progress was recorded in these efforts — directed toward safer practices in such specific areas as grounding, the use of climbing and protective equipment, fire prevention, motor vehicle safety, electric shock and burn, etc. Cooperation of manufacturers of equipment designed for use in utility operations was referred to frequently; and among the indications of specific actions involving such cooperation was the tentative revision of standards for hard hat protective equipment (to be presented next to the EEI Engineering Committee for review).

Perhaps the most dramatic progress was reported in the field of resuscitation. A report from Dr.

W. B. Kouwenhoven of Johns Hopkins University contained highly encouraging evidence of success with the "closed chest" method of resuscitation for electric shock accident victims. (This was described in an article appearing in the Nov., 1960 issue of "The Readers Digest.") A film recording experimental use of the method in the Johns Hopkins hospital was shown.

LEADERSHIP CHANGE on the EEI Accident Prevention Committee next spring will bring to the office of general chairman Stanley H. Young, supervisor of safety of the Hartford Elect. Co. and, as vice-chairman, H. Earl Hatfield, general supervisor of safety of the Georgia Power Co.

Dr. Kouwenhoven also reported that by about February of 1961 refinements will be completed on portable defibrillator, which will be very valuable for use in the field. Meanwhile, he recommended that utility companies take steps to have defibrillator equipment available in hospital facilities on their systems if this is not already set up.

(The EEI reported recently that in the 10-year period of 1951 through September, 1960, the average of 19 cases a year reported in EEI member applications from 1951 through 1954 had dropped to 18 in 1958 and 19 in 1959. Eight cases were reported in the first nine months of 1960.)

The responses to the committee's "Accident Prevention Question Box," circulated to committee members by a group headed by Herbert J. Metzger, of Orange and Rockland Utilities, Inc., indicated considerable variation in handling of specific safety situations and incidents. On the other hand, in numerous areas there are standardized practices prevalent. Some of these are summarized as follows:

1. In 48 of 51 utilities employees perform work on energized lines for distribution customers, while energized, using live line tools.

2. About 80-percent of responding utilities indicate that their employees work from aerial bas-



EEI Safety Achievement Awards for 2-million or more man-hours were made to six member companies for the Apr. 1-Oct. 31, 1960 period, while 61 EEI Safety Achievement Awards were authorized for companies with 1-million or more accident-free (non-disabling) man-hours. One of the 2-million man-hour plus winners was Cincinnati G. & E. Co.'s Miami Fort Power Station, while three more of this utility's departments were 1-million man-hours plus performers. Above, the Cincinnati utility's Pres. Ernest S. Fields (second from right) congratulates his electric department officials (l. to r.): Willard R. Weise, William V. van Gilse, Pearl T. Heady and Virgil H. Lammers. CG&E's director of accident prevention is William J. Eaton, a member of the EEI Accident Prevention Committee. Chairman of the EEI Safety Awards Committee is Edward C. Rue of the Boston Edison Co.

ment; and though these utilities are about evenly divided concerning requirements for "belting" such employees, about 80-per-cent require belting when work must use both hands to do the

Of 57 utilities responding, 46 require the use of personal rubber protective equipment by men engaged in relamping operations on street lighting circuits.

To guard against accidental contact of overhead lines during erection and tree-trimming operations, 53 of 58 utilities report that they reroute the service if requested. The use of railings or ropes is reported by more than 90 per cent of utilities for guarding temporary floor or wall openings necessary for work or material handling during powerplant maintenance.

Where contractors use temporary service poles, 44 of 60 utilities covering such conditions in their specifications or standards stress.

Applicants for work with 55 of the utility companies must meet minimum physical standards determined by a medical examiner; after being injured, employees in but two companies reporting meet physical qualifications as required—in all but two companies reporting—by either the Company physician or the worker's attending physician.

Among the situations where considerable variation in practice was noted is the operation of motor vehicle equipment. The survey disclosed that somewhat over half of the utilities have painted vehicles "high visibility colors" (and one H. Wessels, Jr. of Western Massachusetts Electric Co., referred to this as a definite trend from the conventional green); but, only 42 utilities responding indicated having any positive data to justify establishing the value of such "high visibility" painting in preventing accidents. Still undetermined, is the question of whether or compact cars are safer, according to Mr. Wessels.

In relation to his subcommittee on rubber protective equipment, I. Robert Dohr of Consumers' Co. distributed copies of a

post-accident report which had been sent to supervisors on his company's system. It contained this urgent message of caution:

"If you were involved in an electric shock accident, it is a safe prediction that it would be due to 'failure to follow approved procedures in regard to wearing rubber gloves and sleeves' as was again the case in this accident. A look at the accident experience of the entire utility industry will remove any and all doubt, if doubt still exists in regard to being able to make such a prediction.

"The epitaph for many experienced linemen can be written in seven words 'Failure to wear rubber gloves and sleeves.' Remember your best friends and your last line of defense are rubber gloves and sleeves and other rubber protective equipment. The protection they provide is often the difference between life and death. The final choice as to whether you make full use of this protection, and play it safe, is largely yours because it just is not possible for supervisors to watch work-

men all the time.

"You as the man doing the job have a responsibility to develop a constant safety awareness in order to safeguard yourself. Step number one in setting up your personal safeguards should be to develop the habit of always using your rubber gloves and sleeves. When in doubt if they are or are not required or needed, remove the doubt by being on the safe side—wear your gloves and sleeves and make full use of other rubber protective devices.

"It is most disheartening to concede that in due course we will no doubt have the unpleasant assignment of again reporting an electric shock accident. We can predict at this time that the chief cause will again be 'failure to wear gloves and sleeves or use other rubber protective equipment.' We cannot predict who the victim will be.

"Make sure your name will never appear as the victim in a future electric shock report by resolving here and now to develop the habit of using your rubber gloves and sleeves—always."

EEI Area Development Workshop Stresses Private Enterprise

Research, Planning . . . Keys To Successful Area Development

Area development, as a responsibility of business management, was the underlying theme of the Seventh Annual Area Development Workshop in St. Louis in November. But the meat of the meeting lay in the means of accomplishing the long range goal.

Two basic needs for a successful program of area development were pointed out as being adequate information and an overall plan encompassing not just a given town or city but the surrounding area as well.

Dr. Paul Brann, former director of the Mississippi Industrial Research Center, stated that at the present time almost all utility companies have some sort of research setup to aid their industrial development department. The function may or may not be performed within the department itself. From the point of view of the industrial or area development director, the need for research is obvious; he needs to know more specifically about his

geographical area and the trends and factors which now and in the future will affect it. His basic problem is how to set the research program up.

Specifically, the research program must be flexible and able to meet the day to day problems of the area development department as well as to organize and collect data of a general nature about the area. It must also be ready to go to work on specific problems to find solutions for a given industrial prospect and to aid in qualifying prospects for the manager of the department.

Where the department is small, and even in large departments where the work load does not allow for full time research people, the research institute can be of great value, according to Dr. Charles N. Kimball, president of Midwest Research Institute.

The research institute as a direct aid to area development goes even further, since in many cases, the

Area Development—Cont'd

institutes go into product and application research as well as pure market research. It can pioneer, can aid an existing manufacturer in expanding his product line or his market line or his market, and maintain records of accomplishments. It can thus, be of service both as a source for information and as a direct influence on the growth of the region, he said.

This latter feeling was concurred in by Dr. Merl Baker, executive director of the Kentucky Research Foundation. Dr. Baker pointed out that whereas industry once located in an area and research facilities followed, the current trend is for a research facility to locate where trained people are available and can have a good life, and then act as the drawing card to bring industry into the area where it can draw upon the research facility or the research and scientific personnel in the area.

Institutes Can Become Industries

Further, a research institute, or research facilities of an even more informal nature, can be an extremely healthy industry in itself, according to George R. Herbert, president, The Research Triangle Institute. Since research and scientific personnel are well educated, they tend to want a top-flight environment and once located in it, will work to keep it so. Thus, one facility often can lead to the formation of a second research organization, and so on. And with this wealth of personnel and facilities in an area, Mr. Herbert said, there is a tremendous attraction for other industry to get closer.

The key to the whole area development problem, according to Mr. Herbert, is to develop regionally, not just locally. He believes that it would be far better for one community to lose an industrial prospect to the next town, or to a town in the next state, where there is some direct flow of the revenues thereof, than to lose the prospect to another part of the country. To further this belief, he suggested that regional research centers be set up, to collect, correlate, and distribute facts and data on a regional basis for the betterment of the region as a whole.

Union Electric's President, J. W. McAfee kicked the meeting off with an address stressing the imperative need for private enterprise to carry to burden of area development, or else give way to further Federal encroachment of local freedoms.

"Public ownership is not public—it is enforced private ownership," Mr. McAfee stated. In theory it is wrong, he said, and in practice, it can be disastrous. If the government takes over development of an area, it will be done without regard to the local situation. What works in one area will be done in another area, although the circumstances and conditions may not be at all similar.

What ever is to be done must be planned, Mr. McAfee went on. Then the plan should be tested to be certain it is sound in all respects. Finally, the plan must be sold to others in the area so as to have as large an acceptance as possible.

No one has a greater opportunity nor a greater interest in helping an area grow than the public service organizations, such as electric utilities, he concluded.

The question people should ask themselves, according to R. P. Lee, area development manager, Connecticut Light and Power, and chairman of the EEI Area Development Committee, is, "Is the total worth of industrial growth worth the compromise of Federal subsidy?"

Mr. Lee says, "No," the growth is not worth the cost. Utilities must help slow up the process of government intervention and help show that private enterprise can and will do the job on its own. This, he

stated, is the utilities' challenge, and they accept it, without reservation.

Coordination Necessary

A panel composed of Richard W. McGinnis, director, Lorain County (Ohio) Planning Commission; Robert Y. Adams, Community Planning Consultant; and George Vilican, president, Vilican-Leman & Associates, Inc., discussed the roles assumed and the interconnection of responsibilities of the planning commission, the utility representative for planning, and the urban planning consultant.

Mr. McGinnis said that the planning commission, acting as an official body of the political unit, is responsible for initiating, managing and reviewing and adjusting local and regional plans, and seeing that they are carried out.

The utility, according to Mr. Adams, is in an excellent position to help the commissions in its area to understand what they need in a plan and what they should do with it once the plan is formulated. In this plan, artificial boundaries should be crossed so that instead of talking about arbitrary geographical areas physically and socially related areas are considered together, rather than separately.

The utility can also give aid in establishing political relationships necessary to get a commission plan accepted and backed by local or regional officials, although, he admitted, this is often made difficult because the conditions, although becoming increasingly severe, are often not bad enough for anyone to do anything about them.

Government Will be Top Competitor, MacInnes Tells SEE Sales Conference

"In the decade to come, government will surely be the number one competitive factor in our industry." This was the message of W. C. MacInnes, president of Tampa Electric Company and president of the Southeastern Electric Exchange, to the 300 utility and industry delegates at the SEE Sales, Advertising and Public Relations Conference held November 16-18 in Atlanta.

The Government-proposed na-

tional grid financed by super electric co-ops who would build their own generating plants and transmission lines, presents a very serious threat, MacInnes warned. We must convince the public that through our own system of interconnections, there is no need for this "national grid" system, he said.

"Our second greatest area of competition in the decade ahead will, of course, come from competitive

imarily natural gas." Advertising for gas heat in three months of 1960 will total gas heat campaigns in 1958 and 1959, MacInnes said. More companies are going to resort to offering services such as special electric heating, budget billing, rental arrangements, individual yard and street and company-owned full power service entrances if we meet gas competition on a sound, he asserted.

Not Doing Job

Neither utilities nor manufacturers of electrical products are doing well in selling greater use of electricity, said C. K. Rieger, vice president, General Electric Co. "We are lagging in the past, where we thought growth comes automatically, are not working our opportunities as hard as we should." He listed five basic ingredients in a utility sales program:

Emphasis on the Medal of Honor and electric space heating.

Encouraging your own employees on electric living first.

Developing a major appliance program with all the schools in the territory having home economics classrooms.

Developing a service entrance program.

Developing strong ties with distribution and design programs to encourage dealers and builders to embrace the total-electric concept.

Promoting the Live Better Family Program, said Ralph A. EEI, manager of the Program. The 142 participating utilities expect \$30,521,000 this year in advertising time and space. They will invest another \$102,000 in out-of-sale materials purchased by B&E, he added, and manufacturers will invest over \$20-million in advertising featuring new themes in 1961. Adding these to the \$2,225,000 LBE investment totals well over \$50-million, allowing the effect of LBE's leadership in uniting the industry to generate the tremendous benefits of an integrated family effort, he stated.

Jewell, vice president West-

inghouse Electric Corp., said that the biggest bargain in our business world today is the power and light we use in our mass production methods. At the Westinghouse Vicksburg plant, increased productivity because of air conditioning paid for one-third the initial cost. And the reduction in defective workmanship almost paid the operating costs, he declared. A survey made by a machine tool manufacturer showed that 1960 machine tools used over five times the horsepower

makes of heat pumps are now in use at about 2500 installations on Alabama Power company's system, he said.

Wiring Programs

C. M. Wallace, Jr., vice president, Georgia Power Co. reported that 10,784 homes had been wired or were under contract to be wired in the first 10 months of 1960, under his company's residential wiring plan. Ranges added under the plan—5195, dryers—1548, all electric



"Oh, What A Beautiful Mornin'" is opening feature sung by top officials and speakers at SEE Farm Power Sales Section Breakfast, (l to r) are C. M. Wallace, Jr., vice president, Georgia Power Co.; G. C. MacInnes, president, Tampa Electric Co. and president of SEE; L. T. Wansley, Georgia Power Co., Chairman of Farm Section; unidentified song leader; W. A. Sutton, University of Georgia; J. J. McDonough, president, Georgia Power Co.; and E. A. Wilson, vice president, Alabama Power Co. and Conference Chairman.

power that 1946 units used, Jewell stated.

Howard R. Stevenson, Detroit Edison Co., described his company's new approach to the problem of effectively evaluating and managing sales costs in terms of results obtained and how they sell aggressively and competitively. He said that the success or failure of sales programs may be evaluated on the basis of any of four factors: market potentials, program approaches, administration, and personnel. No single umbrella-like promotional approach can be equally effective everywhere in different regions of a utility's service area, he declared.

Heat Pumps Increase

More than 25,000 heat pumps are being served by SEE member electric systems as of June 1960, according to C. W. Cheatham, Alabama Power Co. He estimated that the total number in the entire country is now about 100,000, but will be 10 to 20 times this number by 1970. Twenty-eight different

heated homes—787, spare range circuits—858, and spare dryer circuits—3138. The total investment in service entrances (10 months) was \$884,430, while the estimated revenue from appliances installed under the plan was \$614,279, Wallace said. In the Atlanta Division, electric ranges were installed in 2559 units in 10 months—94-percent of their total units, compared with their range saturation of 31.7-percent in 1957. Included were 145 apartments in which electric ranges displaced other type fuel ranges, he declared.

According to E. A. Wilson, vice president, Alabama Power Co., in seven months of 1959, 5538 House-power Boxes were installed and installations for the past three months have been at the rate of well over 1000 per month. The estimated annual appliance additions not including replacements, due to the program are: ranges—7025; water heaters—5735; dryers—4475; supplemental heating installations (2.5 kw or more)—500; electric resistance heating installations (entire home)—700; and heat pumps (entire

home)—350. An additional annual revenue of \$958,300 may reasonably be expected, Wilson stated.

H. G. Isley, Carolina Power & Light Co., reported that in a four months period of 1960, 420 electric house heating sales were made compared with 203 in a similar period of 1959, because of his company's new wiring program started July 1, 1960. His company's service area now has 786 heat pumps (not including 1500 dwelling units on the Seymour Johnson Air Base) and 1068 comfort or resistance heating installations, he said.

Heating Rates

Utilities must look at the load factor of the total load, not just the space heating load in the all-electric home concept, according to G. A. Coan, Duke Power Co. The daily peaks of these two loads in a typical household were found to be non-coincident, and the annual load factor was better in the all-electric home than in the non-all-electric home, he said. A recent sample of all electric homes indicates that average annual load factor may be about 23-percent, whereas that of the space heating load by itself may be only about 17-percent or less. Neither space heating nor water heating loads in themselves have attractive load factors, but when considered with the other uses of energy in the all-electric home, the resultant total load is attractive, and a promotional rate may be justified, Coan declared.

Selling Management

In selling management on promotions and programs we must not look at our expenditures as sales expense per dollar of total revenue, sales expense per average customer, and other of the old gauges, warned E. A. Wilson, vice president, Alabama Power Co. and Chairman of the Conference. The only real measure of a sales promotion is the cost of that promotion compared to the amount of increased revenue that it will bring, not only next year but the year after that and the year after that. Too often, he said, we overlook the fact that this increased sales expense will stay the same year after year, while the revenue

it nets increases by geometric progression.

A new approach to a home lighting program was described by George O. Mullan, Potomac Edison System. After one year's operation in use state-wide by the Extension services of Maryland, Pennsylvania, West Virginia and parts of Virginia, a survey of the users showed excellent results: Teachers—63-percent excellent, 28-percent good, 1-percent poor. Extension Field Service Personnel—82-percent excellent, 18-percent good. Dealer Reaction—of 95 dealers contacted, 74-percent are using the lighting material with customers; 43-percent have bought suitable fixture and lamp stock; 4-percent had help from Potomac Edison Home Service Advisors in selecting stock; and 13-percent more will buy with Home Service help. Individuals—35-percent excellent, 64-percent good and 1-percent poor.

Employees On Sales Team

Arkansas Power & Light Co. will get 61,300 prospects from its employees this year, and they will result in 48,000 sales, or 78-percent, said W. M. Shepherd, vice president. If all the company employees were on the sales team and were enthusiastic about it, the company would be getting 100,000 prospects per year, he added. Getting every employee on the team demands management's leadership—which is a great deal more than management's support. You must sell all employees on the benefits which they will derive from their participation. And we think you don't have to pay for prospects to get this kind of company loyalty, he insisted.

Medallion Homes

L. C. Messick, director of the National Medallion Home Program reported that shipments of both types of Medallions rose 19.2-percent during the first nine months of 1960 as compared with the same period of 1959, while private, non-farm housing starts dropped 19.2-percent. During this same period, 297 more utilities applied for authorization to carry on Medallion Home Programs, boosting the total to 656. He said that a recent NEMA-

EEI questionnaire response from utilities showed that 45,893 Bro and 23,434 Gold Medallion Hom were expected to be added in 1961.

Heating Standards

Electric equipment heating standards are needed to upgrade quality and performance of equipment and to check the so-called wattage race of selling the most heat in the smallest enclosures possible and promote safety from fire and shock, warned J. H. K. Shanahan, American Electric Power Service Corp. Standards guide and encourage the allies of electric heating by developing a degree of industry sophistication. We can afford to lose public confidence in the cause of loose standards, he emphasized.

Light For Living

We must light not just for dollars but for living, according to George W. Clark, Sylvania Electric Products, Inc. In order to get better results, he suggested that utilities

1. Set their sights high—don't settle for the past as good enough for the future.
2. Recognize the small funds available for lighting knowledge available but take full advantage of what we do know.
3. Don't fight the growing complexity of lighting practice, rather gear yourselves to it.
4. Don't fight involvement with associated environmental movements.
5. Foster lighting education in colleges and universities in your area.

Advertising Importance

Utilities must remove some of the mumbo-jumbo from their advertising and build programs on facts developed as scientifically as the state of the art and the pocketbook allow, declared Paul V. Hayes, vice president, Connecticut Light & Power Co. When we get the facts, we must focus all of our communications efforts toward correcting the shortcomings revealed, he said. Advertising is one way to compensate for the loss of favorable opportunities to talk to our customers.



MANUFACTURERS-PRODUCTS

Research Spending By Electrical Industry All U. S. Industries

The electrical industry spent \$4-billion for research and development work in 1960, according to Finn J. Larsen, vice president in charge of research, Minneapolis-Honeywell Regulator Co.

Summing up some of the present accomplishments of EMA-member organizations, Dr. Larsen said "deducting government sponsored programs, the electrical-electronic industry will have spent more research during the year than all the rest of the industry's industries combined."

Larsen made the comments as part of a panel of four of the industry's top scientists and engineers some of the rare accomplishments in the field of communication and control, power generating, and structures at the NEMA meeting. Speaking on the material problems involved in direct methods of power conversion, Dr. Seymour W. Herwald, vice president—research and development, Westinghouse Research Laboratories, the NEMA group that the increased efficiency gained by the new direct conversion methods—fuel thermoelectricity, thermionics and magnetodynamics—is accompanied by many tough technical problems, a large share of which are of a nature. However, he said, as the fossil-fuel becomes more depleted, leading to increased costs, the higher conversion efficiencies offered by direct conversion must be realized to sustain our way of life. The time, effort, and money expended to solve the problems is therefore justified.

The quest for greater "materials" knowledge must continue by the electrical industry, according to D. W. Hibbard, Jr., manager of G-E's metals and ceramics laboratory. Since the materials are such a specialized nature, and the requirements so diversified, the industry cannot rely upon

materials vendors to originate materials which are in every respect suited to these specialized needs.

As an example of how this research into materials has benefited the industry, Dr. Herbert Trotter, Jr., president, General Telephone and Electronics Laboratories, described the advances in the field of illumination in recent years. This effort has brought about greater light output per watt in fluorescent lamps, and flash bulbs, brought about the invention of the sun gun (an iodine-cycle lamp) used with movie cameras, and the introduction and development of electroluminescent lighting.

"These four examples of progress in illumination through research have produced many benefits, but with the greatly increased emphasis on research, throughout the electrical industry, all of us can expect far greater benefits in the future," he concluded.

NEMA Outlines 1961 Plans: Wiring Promotion Tops Activities

For the year 1961, National Electrical Manufacturers Association has budgeted \$1,680,483 to cover the expenses of 46 projects. Of this sum, the largest single item of expense, \$267,971, will be the promotion of the Residential and Commercial Wiring Program.

This represents an increase of \$30,127 or almost 13-percent which will be spent to push the Keep Pace Electrically program by elimination of the wiring bottleneck.

The total spending for the association will be increased 3.3-percent over last year, but some \$73,000 in receipts are expected to reduce the amount to be paid by members to \$1,607,483 or a reduction of 1.2-percent.

According to NEMA, obsolescent wiring systems in existing homes and the tendency of builders to install minimum wiring in new homes creates a barrier to full development of potential markets for all electrical goods.

Thus, (1) sales of wire and wiring materials are limited; (2) economic and physical limitations are put upon markets for major appliances; (3) inconvenience of use voids many sales of electric housewares and lighting; (4) rapid increase in kilowatt-hour consumption is impeded, thereby eventually limiting full development of markets for generation, transmission and distribution equipment.

In addition, 10 special projects of sections or groups will be carried out this coming year, but these are not included in the budget of the association as a whole.



members of the Science and Industry Symposium at the 34th NEMA Meeting included, l to r: Dr. Herbert Trotter, Jr., General Telephone and Electronics Laboratory; Dr. Finn J. Larsen, Minneapolis-Honeywell Regulator Co.; Dr. Walter R. Hibbard, Jr., General Electric Co.; Dr. S. W. Herwald, Westinghouse Electric Corp.

GT&D Equipment Division Meets

The first formal meeting of the newly formed Generation, Transmission and Distribution held in Atlantic City in mid-November was devoted to an introduction to the new NEMA divisional operation and the benefits accruing from it.

The group also decided to set up a separate public relations committee to deal with such problem areas as (1) equipment imports from overseas, and (2) equipment standardization objectives, in an effort to help interpret developments for customers audiences, particularly. The new public relations committee, headed by R. B. Reid of General Electric, is to coordinate its work with the standing Public Relations Committee of NEMA.

To guide and assist the various NEMA technical sections in standards work, the Generation, Transmission and Distribution Equipment Division also established a new standards coordinating committee, naming Fred W. Bush of Allis-Chalmers as chairman.

NEMA Meeting Told: Brighter Year Ahead

Looking ahead of the current cyclical decline, prospects are highly promising for the electric equipment industry, according to a forecast made by Dr. Peter B. B. Andrews, chairman of Sales Management's future sales ratings board, at the 34th Annual National Electrical Manufacturers Association Meeting.

Dr. Andrews, a former industrial economic advisor to the U. S. Government, predicted that the forthcoming 1961 sales of generation, transmission, and distribution equipment will be slightly ahead of 1960, with the year starting slowly but winding up on a high note of record prosperity.

"Pressure for expansion by the electric utilities, accordingly, will continue, and for the full year 1961 total utility construction . . . should run slightly ahead of 1960. Beyond that, pressures will build up in '62 and '63, with a stronger resumption of the utility construction uptrend then."

Regarding the general business outlook, Dr. Andrews declared, "The crepe-hangers are overdoing it. They can't see the forest for the trees. Thus, despite setbacks in the steel industry, homebuilding, carloadings and some other basic industries, gross National Product in the third quarter of '60 declined less than one-half of one percent from the second quarter, and it was 4.3 percent above the third quarter of 1959. . . . The economy definitely is not going to the lower regions in a hand cart," he told the section.

Construction Industry To Gain In '61

The brightest spot in the economic horizon in 1961 will be construction, Edwin W. Magee, economist of the F. W. Dodge Corp. said at the Atlantic City NEMA meeting.

According to Mr. Magee, total construction contracts in 1961 will amount to some \$35.8-billion, a

gain of 1-percent over the estimated 1960 level, and the second highest figure on record.

Most of the strength in 1961 is expected in contracts for heavy engineering construction such as public works and utilities . . . amounting to about \$8.9-billion, a gain over 1960 of 5-percent. Residential construction is expected to be up about 1-percent to \$15.3-billion.

All in all, the construction industry should edge upward, reversing the decline of 1960, and paralleling the growth of the nation and the economy as a whole.

Elect Fraser To Head NEMA For '61

A. D. R. Fraser, president of Rome Cable division of Aluminum Co. of America, was elected president of the National Electrical Manufacturers Association at the recent annual meeting in New York. Mr. Fraser was treasurer during the past year and succeeds N. J. MacDonald, president of The Thomas & Betts Co., who headed up the organization this past year.

Elected vice president of the Association was W. R. Persons, president of the Emerson Electric Co., while A. E. Pringle, II, president of the Pringle Electric Manufacturing Co., was elected treasurer.



Three NEMA Awards Presented

Three electrical manufacturers were honored by their associates at the 34th Annual NEMA meeting through presentation of awards "in recognition of their outstanding personal contributions to the progress of the electrical industry."

Recipients of the McGraw Awards were N. J. MacDonald, president of Thomas & Betts and past president of the Association; James Finney Lincoln, chairman of the board, Lincoln Electric Co.; and Everett Morss, president of Simplex Wire and Cable Co.

Mr. MacDonald's award, the Medal for Cooperation, was made in recognition of his personal initiative and leadership in bringing about the concept of "Interdependence" in the electrical industry, from the power supplier through the manufacturer to the contractor.

Mr. Lincoln and Mr. Morss each received Manufacturers Medals. Mr. Lincoln was cited for "outstanding leadership and inspiration in the creation and development of the electric arc welding process." Mr. Morss received his award for "initiative and dedicated industry leadership for introducing conductors to the great benefit of the electrical industry."

To Build Largest For Japan

cock & Wilcox has reported that it has received a contract from the Tokyo Electric Power Co. to manufacture a steam generating unit which will be the largest steam generating unit ever built in the United States and exported to Japan. It will also be the first unit of its kind to be purchased by any utility operating in a foreign country. The boiler is described by B&W as one of its "Universal" series. Using the "once-through" method of steam generation, the unit is designed to operate at critical pressure at 2500 psi. When the boiler goes on-line in Tokyo Electric's New Goi-n, it will produce two-million pounds of high pressure steam at a temperature of 1060 F and a pressure of 2500 psi, with reheat to 1000 F.

The design presents several advantages over other types of boilers according to B&W officials. One of the most important of these is the particular application, is the elimination of large and costly steam drums, since normal weighty lead steam drums present something of a problem when used in an earthquake-prone area such as Tokyo.

Design GE 500/560 kva Pole-Type Transformers

Designed 500/560 kva pole-type distribution transformers which offer savings in cost and weight have been announced by General Electric. The new transformers represent the latest stage in the company's redesign program for single-phase transformers from 250 through 500 kva.

Compared to the Powermaster type of transformers introduced in the new line is smaller in size, lighter in weight, and lower in cost and price.

500/560 kva units are available in standard voltage ratings up to 15 kv and are equipped with the mechanical features and accessories associated with smaller type transformers, including C mounting lugs, internal operation changers and wall-mounted bushings.

NEW PRODUCT DESIGN

Gas Turbine Package Power Plant Offered

A gas turbine package power plant which can be purchased for \$100/kw and can be in operation ten days after delivery has been introduced by General Electric Co. Powered by an 11,000 kw gas turbine, the plant is a compact, self-contained generating station capable of operations with other generating equipment or as an isolated and independent station. Without any external power source, the unit can be on the line at full load in less than 15 minutes. According to General Electric officials, the units will utilize microwave for start and stop and for control of load. Both the power unit and the generator unit are mounted on integral structural steel bases and are housed in all-weather enclosures. Expected noise level with suppressors is about 75 to 80 db. It is anticipated that the units will be out of service only two weeks of every five or six years for maintenance, so that coupled with low fuel costs, immediate economies can be realized.



For more data, mark #1 on reply card.

Synchro-Verifier Relay

A synchro-verifier relay, Type CVE, to verify the condition of synchronism between two voltage systems is available from Westinghouse. It is adjustable to provide a closing zone between $\pm 20^\circ$ and 60° phase angle differences. Connected to the two single-phase sources on either side of a circuit breaker, the relay contacts close to permit closing the breaker to connect the sources when they are in synchronism and equal in voltage.

For more data, mark #2 on reply card.



Compression Connectors

Two-piece aluminum compression connectors to accommodate large size line and tap conductors from 266.8 MCM through 636 MCM ACSR have been introduced by the James R. Kearney Corp. Designed to be installed on energized conductors, the connectors are of the two-piece interlocking type. New type interlock insures ease of installation, uniform compression, full-circumference contact, and eliminates strand cutting or deformation.

For more data, mark #3 on reply card.



Potential Transformer

Development of a 600 v insulation class potential transformer for indoor-outdoor metering applications has been announced by Sangan Electric Co. Accuracy classification is 0.3 for W and X burdens, plus a design allowance for the burdens of two watthour meters, phase-shifting transformer, and demand register. Impulse level is in excess of 10 kv full wave while thermal burden rating and supplemental rating is 0.5 kva at 30C ambient.

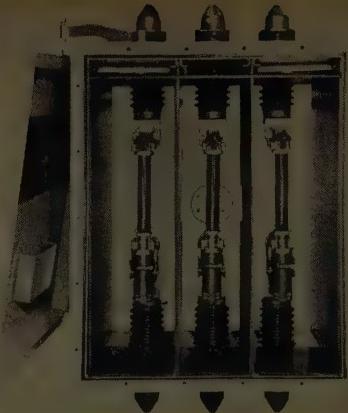
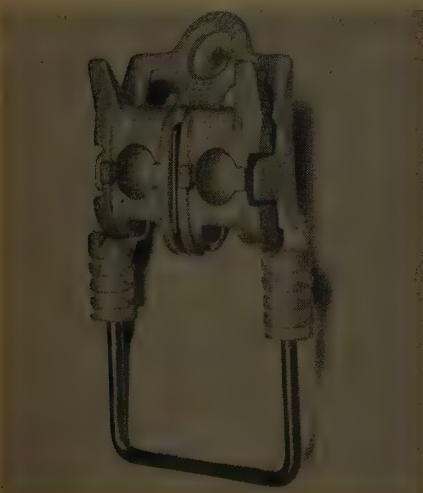
Circle item #4 on reply card



Hot Line Stirrup Clamp

Protection against accidental removal during installation is provided by the novel main wire snap grip of the SC series of bolted stirrup clamps from Jasper Blackburn Corp. Stirrup ends are contoured to provide a strong mechanically interlocked electrical connection, which is then sealed against oxidation and corrosion. Either straight or angled, they are available in copper or aluminum.

Circle item #5 on reply card



Metalclad Fuse Enclosures

Submersible metalclad enclosures for power fuses, rated 13.8 kv and 95 kv BIL, are available off-the-shelf in two basic designs from S&C Electric Co. One design has a hinge type door and accommodates S&C's solid-material boric-acid power fuses Type SM-5C while the second design, intended for confined areas, has a suspension-type door to minimize front and side clearances. It is designed to accommodate Type SM-4b and SM-5B fuses.

Circle item #6 on reply card

Oscillating Derrick

McCabe Powers Body Co. has announced changes and a size addition to its line of PM-30 oscillating hydraulic derricks. Unit is available for pole sizes of 40, 50 and 70 ft. In addition, unit has unrestricted vertical movement and can be spotted anywhere in a horizontal arc reaching from one side of the body to the other. On 55 and 70 ft models, sheave can be hydraulically extended to 54 in. without the digger attached.

Circle item #8 on reply card



Warning Markers

Devised to warn low flying aircraft against collision with transmission line crossings, hollow cone markers of light plastic have been marketed by Pacific Float Co. Suspended at strategic points from transmission lines crossing waterways, canyons, or ringing airports, the markers are kept in constant motion by currents of air. The devices are colored orange in accordance with international air safety codes.

Circle item #7 on reply card

Test Console

For testing errors in potential transformers, the Knopp control and measuring console, Type 1G shown at right above, offers high accuracy and time-savings. Provides an adjustable, accurate voltage supply for 0 to 150 v, 60 cycles. Accurately measures ratio error and phase angle of transformer under test. Errors can be measured for potential transformers from less than 50 percent to 120 percent secondary voltages. 120 to 14400 v.

Circle item #9 on reply card



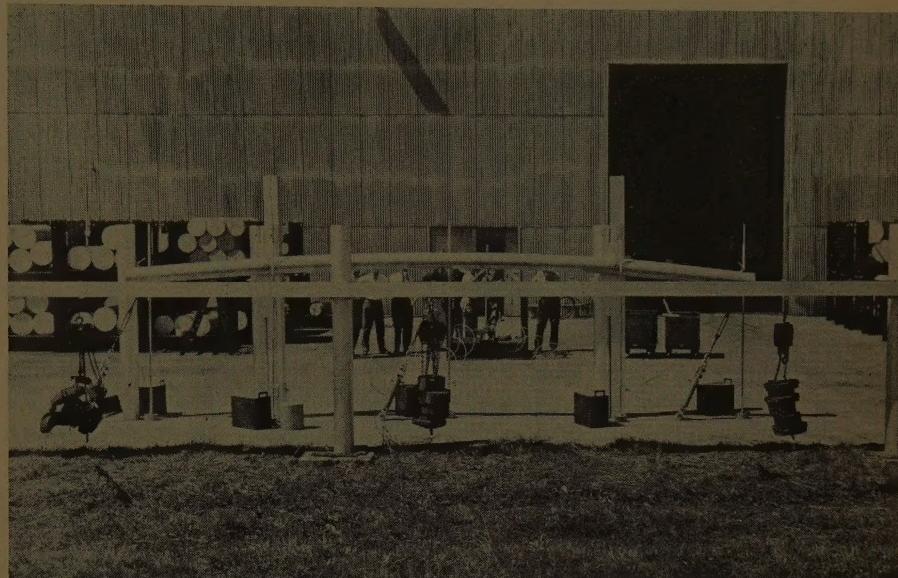


ing Blocks

icularly useful for reconn ing when the old conductor is a pulling line, the wide, throat of the Sherman and Inc. 73-A series block allows passage of splices, compression s, and swivels without danger ing. Frame and sheave are rally designed for extreme et are light and easy to han safety locking head pin elimi accidental opening.

le item #10 on reply card

Test Tubular Aluminum Crossarm At Double Required Load



Tubular aluminum crossarm for 115 kv transmission towers use on the Portland General Electric Co.'s St. Helens-Burlington, Ore., line is tested at the Lafayette, Ind., works of Alcoa. Fabricated from 6061-T6 aluminum alloy on the world's largest extrusion presses, the 26 ft crossarm is shown with a maximum load of over four tons applied. At this load, the steel suspension straps failed. The 8-in. diameter crossarm was thus subjected to almost twice the ultimate load called for by the utility specifications without failure.

Burns and Roe Subsidiary Merges

Franklin Engineering Corp., a wholly-owned subsidiary of Burns and Roe, Inc., has merged with interests of Colonel Clinton B. F. Brill, architect and former chairman of the New York State Thruway Authority. The new firm will be known as Brill Engineering Corp.

Col. Brill is an authority on turnpikes, bridges and urban renewal projects, as well as municipal improvements, redevelopment projects, and the like.

Burns and Roe has only recently departed from its original concentration on design of electric generating stations and entered space age programs such as Nike-Zeus, the ballistic missile early warning system, and Project Mercury.

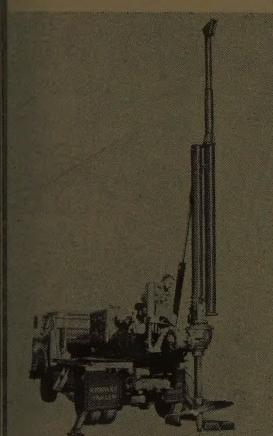
—Sales Briefs—

I-T-E Circuit Breaker Co. has opened two district sales offices to serve their west coast customers. Opened under the direction of George W. Geiger in Portland, Ore., and William V. Knowles in Seattle, Wash., the two offices will cover territories including Oregon, Washington, and the northern corridor region of Idaho. The area was previously serviced by Garland-Affolter Engineering Co.

A new warehouse which will carry a complete stock of non-ferrous and

stainless steel fasteners has been opened by **H. M. Harper Co.** in St. Louis, Mo. Products from the new warehouse will be used to serve customers in Missouri, Arkansas, southern Illinois, and western Tennessee.

Multi-Amp Electronic Corp. has recently named **Burns Electric Co.**, Pittsburgh, Pa., as sales representative for western Pennsylvania and northern West Virginia, for the company's full line of high current, low voltage test equipment and other devices.



Borer

way Trailer Industries has ced a heavy-duty earth machine designed to swing a 60 in. auger in all types of 42-ft sheave height is at by a three-stage hydraulic ping derrick. Hydraulic levels 45° lateral for anchor nd 25° under truck. A self- ed hydraulic Kelly bar pro variable speeds in feed and ion from one easy-to-operate

le item #11 on reply card

Metropolitan Edison Elects Snyder President

William R. Snyder has been elected president of Metropolitan Edison Co., filling the vacancy created by the death of O. Titus on October 31.

Mr. Snyder has been serving as president of Manila Electric Co., a subsidiary of General Public Utilities Corp. like Metropolitan Edison, since 1952.

In making the announcement, A. F. Tegen, president of GPU, said, "The Metropolitan Edison officers and staff are of course entirely competent, but it was felt that Mr. Snyder's long experience as an engineer and chief executive of Manila Electric Company would make a substantial contribution to the further progress of Meted."

Originally starting with Metropolitan Edison in 1924, Mr. Snyder



went to the Manila organization in 1930. Following internment by the Japanese in WW II, he was largely responsible for the reconstruction and expansion of Manila Electric.

Succeeding Mr. Snyder at Manila Electric is John Cotton, former vice president.

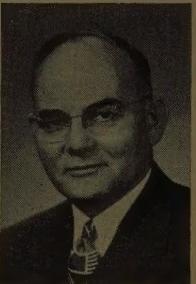
McManus To Retire

Clifford B. McManus, chairman of the board of the Southern Com-

pany and former president of the Georgia Power Co., has retired from active service. He continues as a director.

Mr. McManus has spent 43 years, his entire business life, in

the utility field, originally joining Alabama Power Co. in 1917.



J. J. McDonough, president of Georgia Power Co. has been named Georgia Engineer of the Year by the Georgia Society of Professional Engineers. The Society also nominated Mr. McDonough as its candidate for engineer of the year by the National Society of Professional Engineers, the first time a Georgia has been nominated for the national honor.

John W. Liddle has been named senior resident engineer for Squaw Rapids hydro project by Saskatchewan Power Corp. He succeeds J. M. Wells, who was recently appointed generation mechanical design engineer at the company's head office in Regina.

Pacific Power & Light Co. has promoted Albert Bauer, former assistant chief engineer and manager of construction and operations, to the position of general manager of system-wide district service operation. In further administrative alignments, Harold H. Henning, assistant to the president, has been appointed assistant general manager, while Homer Beale, former assistant general manager for Walla Walla, Washington, Idaho, and Montana properties has been named manager for Oregon properties outside Portland; D. B. Leonard, former assistant general manager for Yakima, Washington, area properties has been promoted to manager for the Washington division properties; Robert R. Gordon, former district manager at Kalispell, Montana, has been elevated to manager for Idaho and Montana division properties, and Roy Vernstrom, former assistant general manager for the Portland division, has been named manager of that division.

Robert C. Horn has been promoted to the post of personnel director by Wisconsin Public Service Co. He succeeded as accountant-eastern division, by J. L. Anderson.

American Electric Power Service Corp. has named George V. Parsons assistant to the executive vice-president. He was formerly with Ohio Power.



"Give me lock washers that will stay put!"

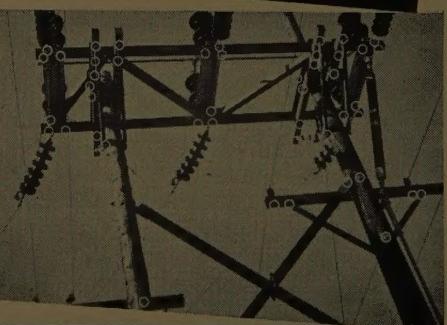
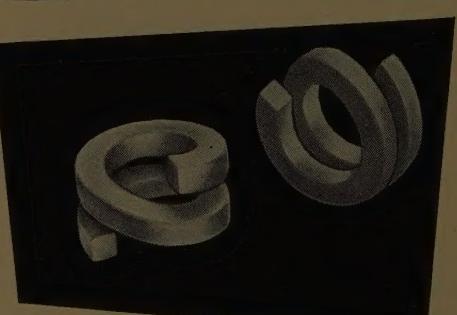
Specify EATON-RELIANCE DOUBLE COIL Pole line Washers

The Eaton-Reliance Thackeray Spring Washer was engineered specifically for pole-line usage where there is vibration and stress. Because of their greater reactive range, these DOUBLE COIL HELICAL SPRING WASHERS are specified daily by power line and communications engineers throughout the nation, and are paying off in reduced line maintenance costs because of longer washer life. Remember—the failure of a single spring washer could result in the failure of an entire transmission line. These rugged spring washers provide an extra margin of protection against failure. Write for specifications.

Reliance Division



EATON
MANUFACTURING COMPANY
506 Charles Ave., S.E. • Massillon, Ohio



Sales Offices in Principal Cities from Coast to Coast

ower Co. has announced the
ment of **E. R. Davis** to the
manager of the industrial
department. **C. E. Poovey**
en named executive assist-
trick **D. Huff** was promoted
position of manager of dis-
n engineering and opera-

ditional appointments at
Power include: **Loyd P.**
manager of operation; **W. J.**
an, manager of relays,
and communications; **W. H.**
non, transmission line engi-
L. Finley, substation engi-
nd **W. E. McRae, Jr.**, appara-
gineer. **C. W. Cox** was
ed to assistant superintendent
electrical maintenance and
ction—stations.

States Utilities, Vice Presi-
larold **E. Brown** and **Elbert**
nson have been elected di-
of the company. **Robert L.**
Jr., was elected assistant
y.

Illuminating Co. has ap-
Vice President **John M. C.**
head up employee and pub-
ions. **A. Royal Woods**, treas-
as assumed the additional
f secretary of the company.

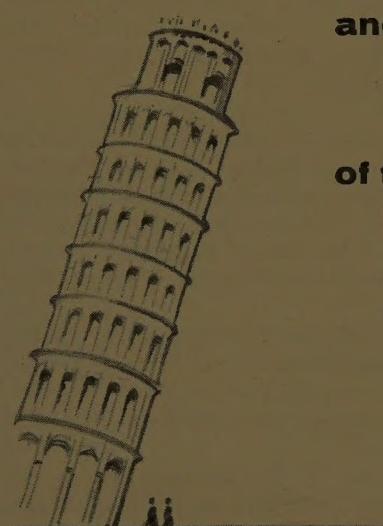
well has been named a vice
it and general manager of
g Electric Co.

H. Weile, a 35-year veteran
acific Gas and Electric Co.,
n appointed division man-
Salinas.

in Public Service Corp., has
ced the promotion of **R. C.**
ormer supervising account-
tern divisions, to the posi-
ersonnel director. He is suc-
oy **J. L. Anderson**.

Lillian Pace, home improve-
pecialist for the Georgia
Co., has been named home
supervisor for the Rome

Georgia Power, **Robert P.**
d, former distribution engi-
Athens, has been named
district engineer.



put up an
improperly designed
photocontrol,
and it's also
just a question
of time.

Apparently no one got a good
look at the specs for the Pisa tower
— or maybe the mayor was the
architect's uncle. Who looks at the
specs of the streetlight controls you
buy and put up in the thousands

— and what proof does the vendor
offer to back them up? Time will
supply the answers, if your source
doesn't. The Fisher-Pierce Co.,
81 Pearl St., So. Braintree 85,
Massachusetts.



FISHER PIERCE

Electrical and Electronic Equipment
for Industry, Utilities and the Home

AN AFFILIATE OF SIGMA INSTRUMENTS, INC.



CALENDAR OF EVENTS

January 11—Edison Electric Institute, Home Service Committee, Chicago, Ill.

January 12-14—Edison Electric Institute, Live Better Electrically Woman's Conference, Chicago, Ill.

January 16-17—Edison Electric Institute, Residential Wiring Promotion Committee, Washington, D. C.

January 17-19—Instrument Society of America, Winter Instrument-Automation Conference and Exhibit, Sheraton-Jefferson Hotel and Kiel Auditorium, St. Louis, Mo.

January 19-20—Edison Electric Institute, Transmission and Distribution Committee, Warwick Hotel, Philadelphia, Pa.

January 23-24—Edison Electric Institute, Electric Space Heating and Air Conditioning Committee, New Orleans, La.

January 23-27 — Doble Engineering Conference, Boston, Mass.

January 25-26 — Southeastern Electric Exchange, Legal and Claims Committee Meeting, Miami Beach, Fla.

January 26-27—Pennsylvania Electric Association, Engineering Section, Communications Committee Meeting.

January 29-February 3—American Institute of Electrical Engineers, Winters General Meeting, Statler Hotel, New York, N. Y.

February 1-2—Edison Electric Institute, Commercial Cooking and Water Heating Committee, Atlanta, Ga.

February 2-3—Pennsylvania Electric Association, Prime Movers Committee.

February 5-7—National Association of Purchasing Agents, Public Utility Buyers Group, Detroit, Mich.

February 8-9 — Pennsylvania Electric Association, Transmission and Distribution Committee, Penn Harris Hotel, Harrisburg, Pa.

February 9-10 — Pennsylvania Electric Association, Systems Operation Committee, Harrisburger Hotel, Harrisburg, Pa.

February 13-16—American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Annual Meeting and 15th International Heating and Air-Conditioning Exposition, International Amphitheatre, Chicago, Ill.

February 16-17—Pennsylvania Electric Association, Engineering Section, Electrical Equipment Exposition, Pick-Roosevelt Hotel, Pittsburgh, Pa.

February 23-25—National Wiring Bureau, 17th Annual National Wiring Sales Conference, Sherman Hotel, Chicago, Ill.

March 5-8—Third Annual Light position, World Lighting Forum, New York Coliseum, New York, N. Y.

March 5-9—American Society of Mechanical Engineers, Sixth Annual Turbine Conference, Shoreham, Washington, D. C.

March 9-10 — AIEE, IAS, IRE, Symposium on Engineering Aspects of Magnetohydrodynamics, University of Pennsylvania, Philadelphia, Pa.

March 21-23—American Power Conference, Sherman Hotel, Chicago.

March 27-29—Southeastern Electric Exchange, Annual Conference, Raton Hotel and Club, Boca Raton, Fla.

April 6-7 — American Society of Mechanical Engineers, Management Engineering Conference, Statler Hotel, New York, N. Y.

April 6-7—Pacific Coast Electrical Association, Engineering and Operations Section, Ambassador Hotel, Los Angeles, Calif.

April 17-18—Pacific Coast Electrical Association, Business Development Section, Sheraton - Palace Hotel, San Francisco, Calif.

April 27-28—Pacific Coast Electrical Association, Administrative Services Section, Villa Hotel, San Francisco.



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